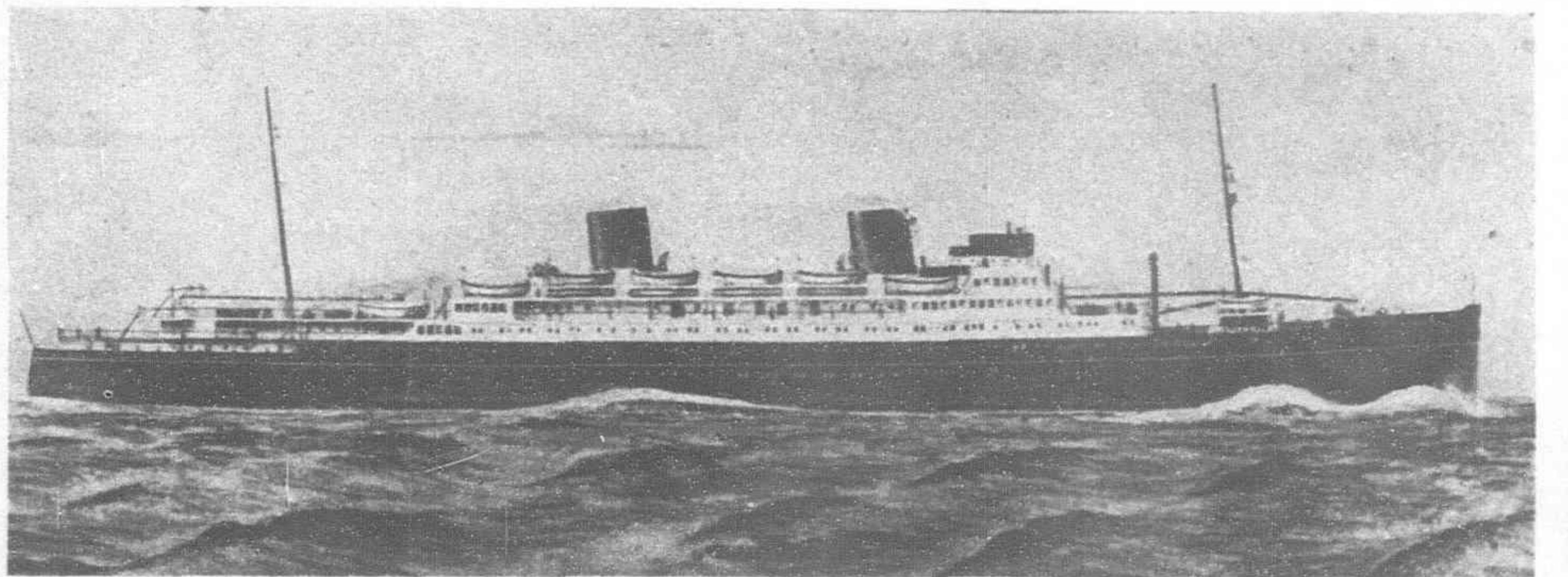


New Era Dawning in Trans-Pacific Travel



One of the Transcendent Trans-Pacific Trio ordered by the N. Y. K. Line to be commissioned in their Orient-California Fortnightly Service in 1929.

Details of the Transcendent Trio:

Quadruple Screw Motor-driven Passenger Liners.

Tonnage	...	...	...	...	...	16,500 gross tons, 22,000 displacement tons
Length	...	...	...	...	...	560 feet
Speed	...	...	...	...	...	19 knots

These vessels will embody the highest ideal of a passenger carrier and are expected to revolutionize the passenger traffic on the Pacific.

Principal Passenger Services in operation:

To North America

Orient—California, Fortnightly Service.
Orient—Seattle Service, Fortnightly Sailings.

To South America

Orient—South American West Coast Service, approx. Monthly Sailing.
Orient—South American East Coast Service, approx. Monthly Service.

To Europe

Japan—Europe Fortnightly Service.

To Australia

Japan—Australia Monthly Service.

To Bombay

Japan—Bombay Monthly Service.

To Japan

China—Japan Rapid Express Service,
sailings every four days.
Tsingtao—Japan semi-monthly Service, etc., etc.

For information, please apply to

Shanghai
31 The Bund

Tsingtao
20 Kuan Tau
Road

Tientsin
K. Y. K. Line,
French Concession

Hongkong
King's Building,
8, Connaught Road

N. Y. K. LINE

Head Office: Yusen Building, Tokyo

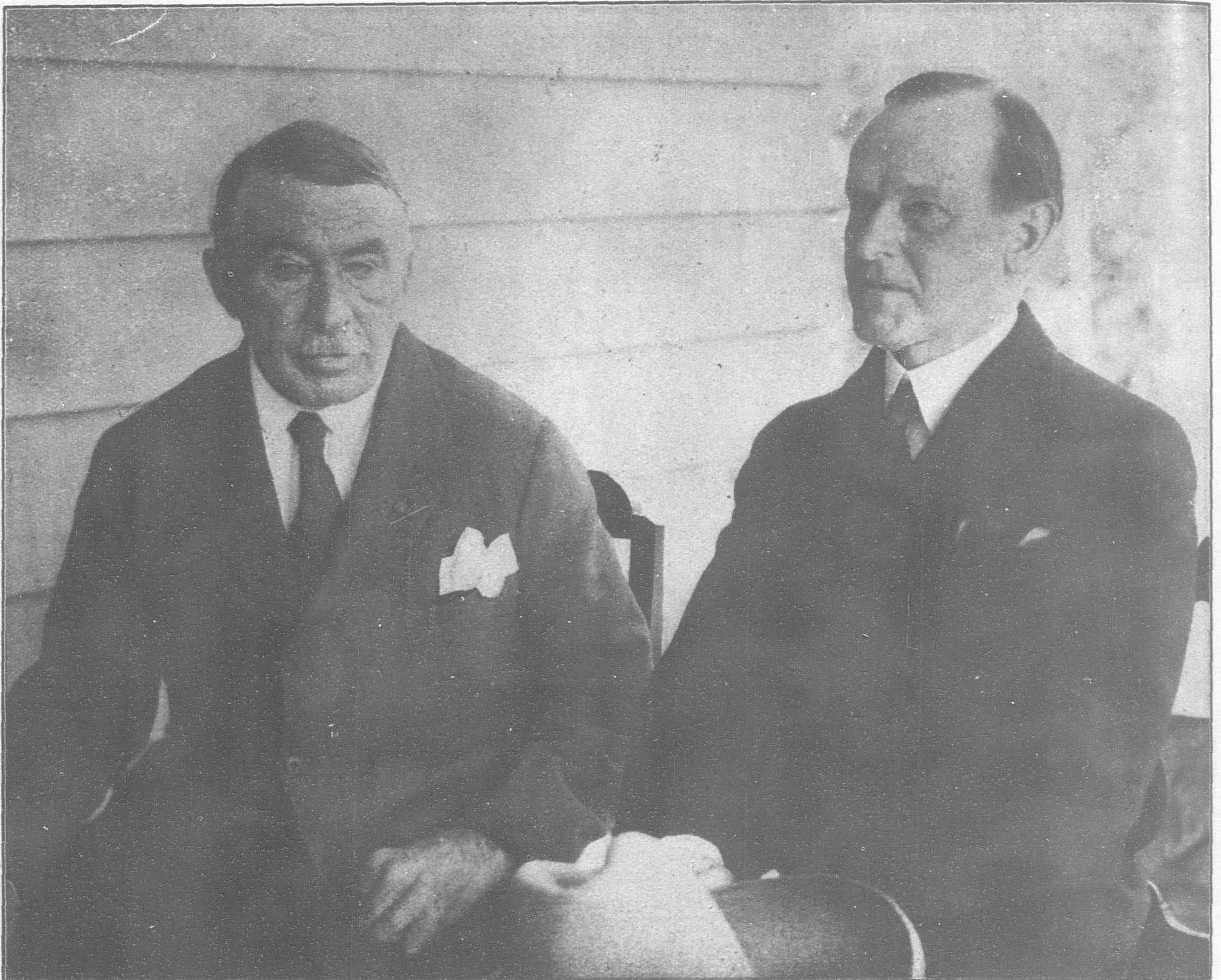


Photo by Underwood & Underwood

Governor-General Wood and President Coolidge

"In the course of numerous inspection trips to all parts of the Archipelago I found the people living under better health conditions, generally prosperous and contented and more than ever appreciative of the benefits of American sovereignty and of the vital importance of free trade relations with America."—*Governor-General Wood's last report to the President of the United States.*

The Far Eastern Review

ENGINEERING

FINANCE

COMMERCE

VOL. XXIII

SHANGHAI, OCTOBER, 1927

No. 10

The American Government Upholds the Treaties

Orders Issued Protecting American Citizens and Goods Against Illegal Taxation in China

IN the relations between the American resident in China and the various Chinese Government, the only factors that can make for a harmonious management of trade and commerce is the strictest adherence to the law, until the law is changed. The basis of all law between China and foreigners in her territory, is a body of treaties, which must stand until they are changed by negotiations or, to put the matter with perfect candor, until China has been able to enforce their abrogation by military prowess. There are many sentimental and logical reasons for the revision of these treaties. They are in many respects antiquated and do not always therefore fulfill the requirements of the moment. The Powers have often expressed a sincere desire to revise the treaties. The Washington Conference provided a definite procedure to accomplish this task. The Tariff Conference in Peking and the meetings of the Extraterritoriality Commission in Peking were definitely for the purpose of treaty revision. The Christmas Day note, numerous pronouncements by the American and Japanese Governments were made in the hope that treaty revision might be accomplished.

But every effort on the part of the Powers has met with failure because of the civil wars in China, because there is no Government in China which has ample jurisdiction over the entire country to make it possible for any Power, no matter how friendly, to negotiate a new treaty. If the Powers were to recognize the divisions in China and negotiate with each of the parties separately, the Chinese would accuse them of encouraging the partition of China. Were the Powers to negotiate with the Peking Government, Nanking, Hankow and Canton or any other group in China would accuse them of supporting northern militarism, while should they negotiate with Nanking, Peking would desry them for associating with Communists.

The Powers then are forced to sit back and wait until such a Government does appear in China which represents a fairly sizeable proportion of the provinces and of the Chinese people. But in the meantime, it is impossible to recognize that existing treaties are scraps of paper; it is impossible to permit the assumption that any one of the Governments of China can unilaterally, of its own accord, declare the treaties to be ineffective, obsolete and inoperative.

The Nanking Government attempted to take that stand with regard to those clauses of the various commercial treaties dealing with duties. There is much academic justice in the attitude of Nanking's Minister of Foreign Affairs, Dr. C. C. Wu, who is serving his country valiantly under the most trying circumstances. Tariff autonomy ought to be an inalienable right. The Chinese lost that right four score years ago in a war, but more as the result of the ignorance and pride of her Manchu officialdom. A nation,

like an individual, has to suffer for her past. China to-day is justified in asserting the right to tariff autonomy; China should possess tariff autonomy, but the road to that goal is internal reconstruction, the strengthening of Governmental agencies, the creation of a single Government recognized by all the provinces with which the Powers can negotiate a new treaty righting many of the historical wrongs in existing treaties. Dr. Wu erred in assuming that because the existing treaties are wrong in many respects, he could declare provisions of them inoperative. The reply of the Powers was to invalidate the orders placing surtaxes upon their goods passing the Customs in violation of the treaty provisions.

Three cases were brought before the courts for the purpose of judicially establishing the inviolability of treaties. In the British case, the British Supreme Court in China decided that British subjects need but pay the treaty duties of five per cent. advalorem plus a two and a half per cent. surtax which the British Government had recognized. The British consul was authorized to issue releases to British ships and warehouses to release goods upon which this duty had been paid to the British consulate. The Japanese Court decided that Japanese goods could be released upon the payment of the treaty five per cent. as the Japanese Government had not recognized the validity of the surtax. The American Court felt that it had no jurisdiction, Commissioner Lurton stating his position as follows:

"It seems that the main question herein involved develops into a purely political one, and must be settled by the Executive Department of our government, and that it belongs to diplomacy and not to the administration of the law. Whether or not our Executive Department chooses to settle this question, or to disregard it, is not within the purview of this Court. The plaintiff must look to the Executive Department for such relief as it may deem itself to be entitled."

"In view of the whole situation as found by the Court, it is regrettable that circumstances over which the parties hereto have no control should ever prevail. It seems that a certain faction of the Chinese people have assumed control of their government's Customs at Shanghai, and in the face of binding treaties which to any country maintaining the high standard of civilization should be scrupulously executed, have totally disregarded these treaties by attempting to collect more duty than is stipulated therein."

"Whether the present treaties between the United States and China are just or unjust to either side, they have been entered into under the most solemn and profound conditions, and agreed to by the highest officials of both of these countries. Until a revision of these treaties have been made by a convention between these two countries, it certainly behooves both

sides to use the utmost endeavor to see that they are executed according to their full tenor."

The result of Commissioner Lurton's decision was the immediate cancellation of shipping contracts on American ships on the Pacific. The importers in Shanghai and South China felt that their goods would be better protected if carried in British and Japanese ships and if deposited in British and Japanese warehouses. It appeared for a moment that the American Government had recognized the right of the Nanking Government to invalidate the treaties and to act independently of all treaty provisions. There was great rejoicing among certain elements of the Chinese, who think only in terms of diplomatic victories and who have no prescience in viewing their country's future. The denationalized Americans, who are thinning in number in China, were also full of tremendous enthusiasm. The American Government would kill American shipping on the Pacific to prove its willingness to permit a Government of a part of China to violate a treaty between the United States and China, they believed.

Then came the definite decision of the American Government to enforce the treaties. That decision was as clear-cut, as certain, as positive as any step which any nation has so far taken. It permits the release of American goods upon the payment of the five per cent. treaty duty only, whenever any Government of China imposes a higher duty without first negotiating a new treaty. It does not concern itself about the two and a half per cent. surtax which the British have recognized but which the United States ignores because it is not provided for by treaty arrangements. In a word, the American Government, which fully sympathizes with China's ambition for treaty revision, stands by the present treaty, until there is revision in some orderly, representative manner. The official notice with regard to this question is herewith given.

AMERICAN CONSULATE-GENERAL,
Shanghai, China, October 3, 1927.

Subject : Duty on Imports.
CHAIRMAN, AMERICAN CHAMBER OF COMMERCE,
3 Canton Road, Shanghai.

SIR.—Reference is made to the letter of September 9, 1927, from the Secretary of the Chamber of Commerce inquiring whether American merchants can clear cargo by depositing with the American Consul-General the treaty duty and the two (two and a half per cent.) surtaxes and to my reply of September 13th stating that the Department of State had instructed the Consulate-General on August 1st that it could not become the depository for Customs revenues in the manner suggested by you.

I now take pleasure in advising you that I have been authorized by the Department of State and am prepared to accept deposit of the treaty duty, wharfage and conservancy dues on consignments of wines and liqueurs subject to the special thirty per cent. stamp tax and on consignments of tobacco products subject to the fifty per cent. tobacco products tax, and to inform American warehousemen that there is no objection to their releasing such cargo.

The conditions under which this will be carried out will be made known to you and interested firms not later than the fifth instant. Suffice it to say that the request for the release will be made upon the payment of treaty duties only.

Very respectfully yours,
(Signed) EDWIN S. CUNNINGHAM,
American Consul-General.

The Development of Manchuria

THE interviews which we publish in this issue of the "Far Eastern Review" with Mr. Yamamoto, President of the South Manchuria Railway and Mr. Matsuoka, Vice-President, give a very definite idea of the purposes and plans of the new administration of this most important artery of communications in Manchuria.

What they do not state in their interviews, but what is so clearly to be noted in the entire orientation of Japanese policy, is that there are two aims which the Japanese have in that country : (1.) is clearly the economic development of Manchuria as a trading proposition, as a source for raw materials for Japan and as a prosperous part of China in which Japanese can live and trade. There are no political motives associated with this ideal. It is as genuine as was the British desire to develop an economic mart in the Yangtze, without political associations. (2.) The second Japanese motive has, however, some political connotations. For, Japan is very definitely faced with the probabilities of a Russian imperialistic movement in China, which has for its principal purpose an onslaught upon Japan, with the ultimate object of reducing Japan to a secondary power.

This second factor easily becomes the more serious one, for the very life of Japan is dependent upon peace in Manchuria. There has been too much talk in connection with the Russians about Communism and Bolshevism. These European political terms have little to do with the situation in Manchuria. Russia is not seeking to turn Manchuria Communistic. Russia is seeking, however, to prepare Manchuria as a battlefield in her eventual war with Japan. And that is a very serious matter, for it is not possible

that Russia can attack Japan in Manchuria without involving all the principal Powers, including the United States in another world war. It is for that reason that everything about Manchuria takes on such immediate importance. It is the probable scene of the next great international conflict and the two or three silly Americans, who are suffering from a Japanophobia and therefore are supporting the Soviet attitude in China, do not altogether realize what they are about. They support Soviet Russia because they hate Great Britain and Japan and they hate Great Britain and Japan because these Empires are large and peaceful and successful. They prefer the madness of Russia because it appeals to their sense of helping the under dog, but Russia need not have been an under dog were it not for her own contrariness in attempting to disturb everything that is sound and constructive the world over.

Manchuria is economically the most modernly and intensively developed region of China. In Manchuria there are more railways than in the rest of China put together, more in number and in mileage. In Manchuria there are more good roads than in the rest of China. The whole of Manchuria is tied together by a system of long distance telephones, which one does not find elsewhere in China. Not all of this has been done by Japan, but Japan has played a pre-eminent part in the economic development of the country and in indicating to the Chinese a path toward modernity. This is constructive work of an order which deserves the gratitude of the Chinese people, who after all, are the principal beneficiaries. That they will be grateful at the crucial moment is a foregone conclusion, for every indication, political and social, points to the closest co-operation between Chinese and Japanese.

President Yamamoto on Manchuria

CO-OPERATION between Japan and China in the development of Manchuria, cessation of the obstacles offered by the Chinese to Japanese legitimate efforts in Manchuria, and, in some instances, to the very presence of Japanese there; and, generally, the bringing about of greater regard on the part of the Chinese for

Japanese rights there; these factors form the "positive policy" of Japan in Manchuria, exaggerated fears of which have caused objections to arise in some quarters, says Mr. J. Yamamoto, who recently took over his duties as President of the South Manchuria Railway Company, the principal instrument of Japan's interests

in Manchuria. There is nothing new about all this, no thought of aggression. On the contrary, the keynote of this policy is the eradication of such opposition and working at cross-purposes as has developed during recent years so that the peaceful and prosperous advancement of Manchuria may be hastened to the advantage of all concerned.

"Manchuria has prospered largely through Japanese efforts," says Mr. Yamamoto. "Japan came to Manchuria when she preserved these provinces for the Chinese. She has the right to remain by virtue of the treaties following the Russo-Japanese war. She has justified her presence by the development which she has brought about.

"It is true, of course, that Japan has served her own interests, also. Thus she has in Manchuria her first line of defence. She does not want war in fact, she is eager to preserve peace—but strategical reasons form one benefit which she derives from her presence in Manchuria. Japan has also gained from the great agricultural and industrial development of these provinces, but the Chinese have been the principal gainers therefrom. When one considers the direct debits and credits of this situation, counting in the expense which Japan incurs in maintaining the Kwantung Government and her military and police establishments, it will be found that Japan spends there annually ten million yen over and above her gains. Furthermore, it must be remembered that practically all the earnings which Japan makes in Manchuria are not taken away, but are put back into the country. So while it is true that in a broader, indirect way, Japan gains from her presence in Manchuria by drawing thereon as a source of raw materials and by utilizing it as a market for her manufactures, the direct gain is practically all Chinese.

"The so-called 'positive policy' of Japan contains nothing

new or startling. It is ridiculous to refer to it as a sort of new 'Twenty-one Demands.' Its purpose is simply to follow the same broad lines as I have stated. It is just the contrary to aggression, as its principal purpose is to remove causes for friction, contention, and misunderstanding. It wishes to define clearly the existing rights of Japan in Manchuria, which

have had legal existence for a long time; to bring about regard and respect on the part of the Chinese for these rights; and then, if we can, to co-operate with them—and, if we can, also with the Russians—for the continued and greater development of Manchuria. The principal point of difficulty at present lies in the disregard for Japanese rights shown by the Chinese authorities by constructing railway lines which violate Sino-Japanese agreements. The principal point is not so much the actual construction, as it is the principle involved. We cannot allow the Chinese to flout Japan's legal rights and privileges. On the other hand, if the Chinese, instead of going ahead in total disregard of Japan's rights, will first come to Japan to negotiate and settle such matters, they will not find Japan unreasonable. But if the Chinese insist on disregarding Japanese interests and in opposing every effort which Japan makes in various ways to further the development in Manchuria, we must call a halt now.

"It is plain that it is to the great interest of both the Chinese and the Japanese that Manchuria be developed, and while the Chinese have had the greatest profit, it is but fair to say that the Japanese have done the greater share of the work. We are willing and eager to carry on with this development, and it can be carried on only through co-operation by the Chinese and the Japanese, assisting each other and respecting each other's rights. This, and this only, is the essence of the 'positive policy'."



Mr. J. Yamamoto, new President of the South Manchuria Railway Company

Railway Competition in Manchuria

THE development of Manchuria and, concurrently, the increase of her production, is progressing at such a rate that such apprehension as has been expressed in many quarters to the effect that bitter competition will occur between Russian, Japanese and Chinese railway interests, will be found to have no basis. In spite of the building of new railway lines, production is increasing at such a rate that there will be more than sufficient freight for all of them. This is the opinion of Mr. Y. Matsuoka, who was recently appointed Vice-President of the South Manchuria Railway, the principal instrument for the maintenance and furthering of Japan's interests in Manchuria. His opinions carry weight as he formerly spent a number of years in Manchuria in his capacity of Director of the South Manchuria Railway Company. He is a man of the far-visioned, constructive type and was a great constructive force during his period of activity in the Three Eastern Provinces. In fact, it was due mainly to his initiative that the railways were built between Chengchiatun and Taonan and between Taonan, an important center near the border of Manchuria and

Mongolia, to Tsitsihar, a point on the Chinese Eastern Railway, west of Harbin. This road, which was completed last year, was built by the S.M.R. as a contractor, the Chinese, who are now operating it. It is of great importance as it completed the connection between Tsitsihar and Ssupingkai, a point between Mukden and Changchun, thus opening a great, almost undeveloped region to immigration and development and providing an outlet for the goods originating there for transport to Dairen. The railway attracted considerable attention among students of China's problems, many of whom have seen therein a source of likely friction between the Russian interests, represented by the Chinese Eastern Railway, and the Japanese. Mr. Matsuoka was also largely responsible for the carrying out of the project of building a railway from Kirin, the capital of the province by that name, and Tunhua, a town east of Kirin. This line is now under construction, being built by the S.M.R. for the Chinese. Its importance lies in the fact that it forms an extension of the line from Changchun, the junction point of the S.M.R. and the C. E. R., and provides a link of

the projected line to a point on the Korean coast, which, if completed, will furnish a railway running direct from the Korean coast to Changchun, which is in the heart of a great and very fertile region.

The construction of these lines has led many to hold the opinion that the result must be competition and friction between the Russians and the Japanese. To this may be added another factor, namely potential friction between the Chinese and the Japanese owing to the construction by the former of several railways, and the planning of still others, some of which, if completed, would parallel and compete with the S.M.R. line. Such lines would be in direct violation of the Agreement between Japan and China, entered into in 1905, whereby China undertook not to construct any lines in Manchuria paralleling or competing with the S.M.R. lines. Among these lines is one running from Takushan, a point south-west of Mukden on the Mukden-Tientsin line, towards Payantala, the terminus of a railway built by the Japanese for the Chinese, which runs almost due west towards Mongolia and connects with the S.M.R. main line. This line is now under construction by the Chinese who have completed a great part thereof. The Japanese have objected thereto through diplomatic channels, owing largely to the fact that its completion would draw traffic not only from the S.M.R., but also from the line built by the Japanese for the Chinese, for which the former have not yet paid; and partly because such building constitutes a direct violation of a legal agreement. Another line now being built by the Chinese extends from Mukden in a north-easterly direction to Hailungcheng, the center of a great agricultural region. Although an agreement existed between the Chinese and the Japanese that if this line should ever be built, it must be built for the Chinese by the Japanese, and a loan was advanced to the Chinese for the purpose—which they spent for entirely other purposes—the Japanese consented to the construction of this line by the Chinese themselves, with the understanding that it should not be extended beyond Hailungcheng to Kirin. Now, however, the Chinese are making active preparations to build the link between Kirin and Hailungcheng, which will, if completed, form another road paralleling and competing with the S.M.R., main line running south from Changchun and with the Changchun-Kirin road.

All these elements contribute to the development of the present complicated railway situation in Manchuria, and as railways furnish the most important factor of the economic, and to a great extent of the political situation in Manchuria, the solution of these problems is essential. Mr. Matsuoka makes it clear, however, that the Japanese Government is concerned mainly in the upholding of the principle that treaties and agreements must be lived up to. Once this has been settled, he believes, the actual matter of the construction of these various projected railways may be settled relatively easily by mutual arrangements. Manchuria is increasing her productivity so rapidly, he points out, that the new, as well as the existing railways will have all they can do to handle the increased traffic and the much feared competition will be found to be entirely exaggerated. The Japanese are as eager as are the Chinese themselves for the development

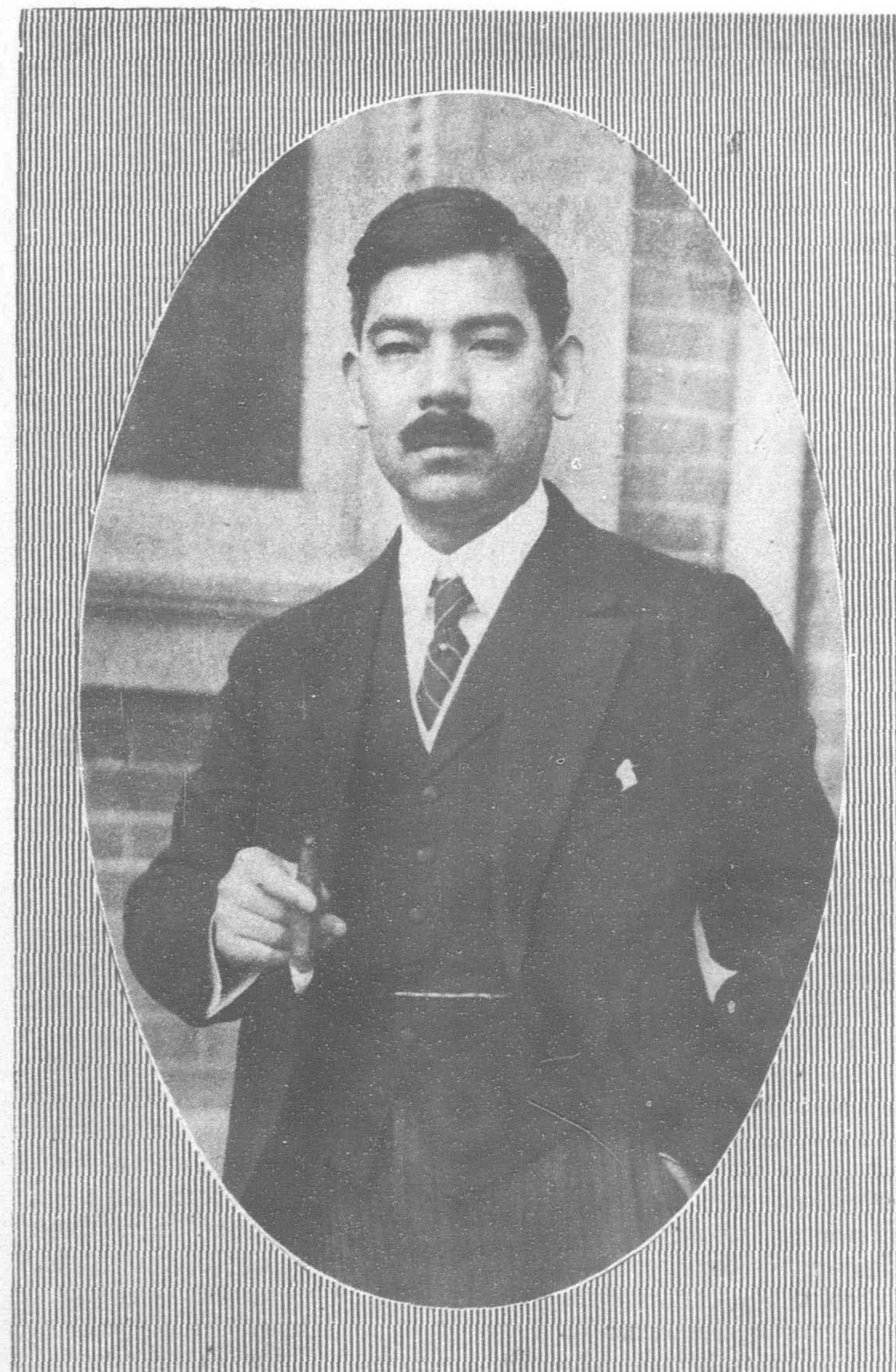
of Manchuria, which will furnish for Japan a great source of raw materials for her factories, and concurrently, develop a great population which will be purchasers of the goods which Japan manufactures from such materials. So the Japanese are interested in seeing railways increase in Manchuria and will not only be willing to see the Chinese build railways, but will assist them to do so, if such assistance is wanted, provided only that the Chinese abandon their present attitude of high-handedly disregarding and over-riding the Japanese interests which exist by virtue of long-standing legal agreements and treaties.

"The annual increase of freight carried by the S.M.R. lines has in recent years amounted to about 1,200,000 tons annually," said Mr. Matsuoka in discussing this question. "Even if we make allowance for some decrease in this ratio in future, it is entirely reasonable to estimate that such increase will amount to over ten million tons within the next ten years. To handle this vast increase of goods to be carried will call for every possible effort on the part of the railways. There will be more than enough traffic for all of them. It is more likely that they will have to call upon one another for help than that any competition will occur. There is no reason for the Russians to fear the presence of the Tsitsihar-Taonan railway, and the questions between the Chinese and the Japanese are important mainly as a matter of principle."

"For a number of years past the number of Chinese immigrating into Manchuria from Shantung and Chihli has been between 300,000 and 400,000 annually, though of these a number were seasonal laborers who returned to their homes when the Manchurian harvest was over. More recently, however, conditions in Shantung especially have become so intolerable that great masses of the population there are coming to Manchuria in order to seek in the east, tracts of rich uncultivated arable regions peace and order

and an opportunity to found new homes and make a living. This year, therefore, these immigrants are bringing in their families, showing their intention to stay, and their total this year alone will be about 800,000, at least. As a consequence, the lands along the new lines are being rapidly settled and developed, and the activities of a huge army of settlers who must work hard in order to live, must cause a tremendous increase in the produce of Manchuria. I believe that this increased land development and resultant traffic will justify the building of at least 5,000 miles of new railways in Manchuria within the next ten years."

"So you will see that in the matter the construction of new railways by the Chinese the question of principle is the predominating feature as far as Japan is concerned. The building of the Kirin-Hailungcheng line, for instance, is in direct disregard of the Japanese rights and interests. The Chinese are acting as if these did not exist. Apparently they have forgotten or choose to disregard that, after all, it was Japan who preserved Manchuria for the Chinese when she not only spent her blood and treasure in driving out the Russians, who would otherwise, have made these regions a Russian territory, but even staked her existence as a nation on the issue. It is, of course, true that she fought Russia mainly for her own preservation, but at the same time she was fighting Manchuria's battle. Furthermore, Japan has worked hard during the past



Mr. Y. Matsuoka, Vice-President of the South Manchuria Railway

twenty years in Manchuria and has contributed greatly to the development and present prosperity of these provinces."

"It is evident, therefore, that Japan must feel that the Chinese are bound not only by their legal but also by moral obligations to observe the Japanese interests in Manchuria which are clearly defined by agreements and treaties. It is the principle which is at stake. If the Chinese, instead of disregarding Japan's rights and interests, should come to Japan with their proposals, they would meet with a very reasonable attitude and Japan's objections might even be withdrawn. On the other hand, if Japan should now suffer the Chinese to disregard her rights in the present instance, a precedent will become established which may eventually lead the Chinese to want to drive the Japanese out of Manchuria altogether and create a situation where Japan may have to call to their attention the fact that, after all, Manchuria is historically entirely distinct and separate from China Proper

and that it may be necessary to deal with Manchuria as such."

In this connection, Mr. Matsuoka was asked what he thought of the reported Chinese proposal to develop the port of Hulutao, a point of the Mukden-Tientsin line which has for some years past been regarded as a possible great port which might serve as an outlet for goods originating in Manchuria and brought there by the Chinese lines, existing and to be constructed. Mr. Matsuoka did not, however, regard it as possible that Hulutao may be developed to the point where it would be a serious rival of Dairen. He repeated his contention that the increase of production in Manchuria would furnish traffic enough for all concerned. It would, he stated, take ten years to construct an adequate port there, and by the lapse of that time the two or three million tons which would be the maximum that Hulutao would be able to handle, would be but a comparatively small factor as compared with the general increase of produce which must accrue during these ten years.

The Winning of Oriental Trade

By A. F. Haines

ONLY of comparatively recent years have the people of the Northwest begun to visualize the possibilities of trade with the Far East across the Pacific Ocean, although the Oriental business has been fought for century after century by several European countries, each knowing that the winning of that trade meant wealth for the nation, as well as for the individual obtaining it.

Spanish, Portuguese, Dutch, British, French and Germans have each made their bid more or less successfully, and America is but a late comer. Nevertheless, this country is the nearest of all the Western peoples to the Far East, and of this country there is no state more favorably situated than Washington.

In the past more than one effort has been made to anchor Oriental trade to the United States, but for various reasons these efforts have not been other than spasmodic. Our people have been slow to reach out for foreign trade. In the beginning, more than a century, nearly a century and a half, ago, the northern states on the Atlantic Coast opened a profitable trade by sailing ships. But Boston, Baltimore, Philadelphia and New York are a far cry from Canton, then the only port open. Even the mouth of the Canton River was guarded by a Portuguese trading port, Macao, established in the Sixteenth century. Japan was not opened, Malaya was not developed, Java was jealously controlled by the Dutch, and India by the trading monopoly of the now defunct East India Co.

Nevertheless, the beginnings of that trade established certain industries on the North Atlantic Coast which have survived to this day. These, indeed, before the World War, took about 90 per cent. of all imports from the Orient arriving on these shores. The State of Washington absorbed but 10 per cent. To-day conditions have changed. Washington now absorbs about 30 per cent. and handles yet another 20 per cent., trans-shipped through the Panama Canal. Handling by the port means money to the port. That is how the great ports of the world have been built, not so much by absorption of material for manufacture or for direct use, as by the handling of goods imported or exported.

In more or less modern days this old-time trade has developed on a new basis. The Pacific Coast will be the chief factor, not the Atlantic. Also there is now existing a national commercial policy. The Federal Government is supplementing its consular service by trade commissioners. These officials are not boosting for any one particular firm or article. Their purpose is to recognize national wants and tell Americans about them, so that there may be figured out some manner of supplying them. Such wants may be cultivated, as, for example, the introduction of American cigarettes in China.

Now, if it is good for the Federal Government to so advertise and promote American interests as a whole, why isn't it good policy for the ports of the State of Washington to do likewise as to their own interests?

Nor should it be forgotten that in this respect the ports are representative of the whole of Washington. If the population of the Far East could be persuaded to eat but one apple each year apiece and buy that apple from this state it would absorb the entire export crop of Washington. Some people may think this is talking through my hat. But figure it out: There are over 400,000,000

people in China, 60,000,000 in Japan, 40,000,000 in the Dutch Indies, 340,000,000 in British India, inclusive of its feudatory kingdoms. Now throw in Siam, Malaya, French China, Eastern Siberia and the Philippines, and more than a billion is the total.

Counting three apples to a pound, or 120 to the 40-pound box, the result is one apple each year to each person, and the quotient is more than 8,000,000 boxes. I don't think I am so far wrong in my illustration of trade possibilities. One apple per year per person.

If the Oriental will smoke American cigarettes and use American flour, why should he not eat American apples? Therefore the apple grower is just as much interested as any Washington port in a trade envoy to the Orient. Also isn't the same thing more or less true with most of the Washingtonian products?

Only about one per cent. of the possible trade with China is developed. It is true that the British and others have the best part of the trade that is developed. And, once established, trade is hard to move from its old ruts. The Chinese know the British firms which have been there for decade after decade. But their trust is in personalities, though the "chop" or "hong" or trademark, or firm name, go a long way. They trade with a certain person because they know all about him. The State of Washington to a Chinese, to an Oriental, is but a geographical or political abstraction. It is not a living thing. But it becomes alive when it is identified with a Washington envoy. Which is why we should have such an envoy, or envoys, on the ground. He should be a man acquainted with the Oriental temperament and methods not less than he is acquainted with this side of the water. Also he must be content to remain there for a term of years and thus become a well-known and trusted personality.

By the Washington State Chamber of Commerce the proposal was placed before the Seattle Port Commission. That body instantly grasped the importance and has agreed to put up 50 per cent. of the cost if the other ports of the state will put up the other half. The matter has been laid before them for consideration. What the outcome will be I do not know. But the idea should not be allowed to fall by the wayside even if the Port Commissions of the state are not willing to take it up conjointly. There are other persons and interests also vitally concerned. Every resident of the state is interested. So is the state itself. A fraction of a mill tax now will reduce taxes materially by increasing our wealth and business.

Few people realize—take the apple grower as an example—that it costs no more to send a box of apples to Shanghai than to Butte, Mont. That box can be landed in Manila much cheaper than in New York. Europe is now looked upon as the great market, but apples can be landed in Hongkong at only two-thirds the freight to Europe.

Just how many envoys should be selected depends upon the cash available. Perhaps the first should be to Shanghai, but Japan and the Philippines are of great importance. For from the latter it is only a matter of a couple or three days' steam to Labuan, Sarawak, Singapore, Bangkok, Saigon or Haiphong.

There is plenty of material. Moving pictures illustrative of Washington industries, of Washington scenery, will always draw an Oriental audience, which, once gained, can be further secured by actual exhibits of the products.

And reverting to my first query, if Washington railroads and shipping companies, Washington industries, such as flour and fish, find it pays them to keep agents in the Far East, if the British peoples of that homeland, and especially its colonies, maintain what they call their agents-general, if the United States Government keeps its trade commissioners abroad, why should not the effort of a Washington trade envoy, not boasting for any one particular firm or industry, looking upon all alike, prove wise and profitable?

Japan Withdraws from Shantung

IN recent editorial comment on the Shantung movement of troops into Shantung, the FAR EASTERN REVIEW constantly made the point that the Japanese Government were only sending troops into that territory to prevent a repetition of the outrages which convulsed Nanking, Hankow, Kiukiang and other Yangtze cities and that as soon as the emergency was over, that the Japanese troops would be withdrawn.

The Japanese Troops have been Withdrawn

In spite of the efforts of the usual anti-Japanese propagandists in China and the United States, to stir up an embittered public opinion against Japan in the United States, the American people viewed Japan's action as a simple prophylaxis against the murdering of Japanese and the destruction of Japanese property in Shantung. The situation, having eased off, the Japanese troops and marines were returned to their own country. Should the emergency again arise, the Japanese will again be sent into Shantung. Japan has made too huge an investment in the lives of the Emperor's subjects and in wealth to see that province the shambles into which for instance, Hunan and Hupeh, have been turned by the Communists and their imitators.

Japan does not seek to harm China, but Japan cannot view with ease, with a sense of security in the future, the Soviet advance in China by means of propaganda and the utilization of uneducated, half-starved politicians, whose only hope is continued disorder upon which they thrive. In a well-organized China these men could not survive because China would then utilize competent administrators, men of ability and knowledge and these sinister professional politicians would find themselves in a sad discard. They will not succeed if they attempt to use an anti-Japanese propaganda as they did the anti-British propaganda, because Japan is too close at hand. But one would sincerely hope that all this were ended in China; that if there is vitality in the Kuomintang, that the leaders would organize even in the small territory they indisputably hold, a modern, effective Government, free from the curses and professional propagandists and professional militarists.

The Japanese Government issued the following statement upon the withdrawal of the Japanese troops from Shantung:

In view of the disturbances in the district of Shantung in China, the Japanese Government in May last despatched troops to Tsingtao for the protection of our residents in the said district as an emergency measure. Subsequently, as had been expected, the district seemed likely to become the theater of war between the Northern and Southern forces and the danger of commotion in the localities lying along the Tsinan-Tsingtao railway became imminent. Under these conditions, we were compelled to move our troops inland to Tsinan, and we now remain firmly convinced that the timely despatch of the troops certainly accounts for the fact that, notwithstanding such serious disturbances, we have fortunately been able to carry out the protection of our residents satisfactorily and prevent the occurrence of any untoward event. With the shifting of the war situation the state of affairs in Shantung and its vicinity has quite lately tended to stabilization, and as it is considered that, for some time to come, there is no fear of our residents there being affected by any disturbance, the Japanese Government have, in accordance with the statement made at the outset, decided to carry into effect the withdrawal of our troops from the Shantung district.

In case, however, peace and order are disturbed in the future, not only in the aforementioned district but in any part of China,

where many Japanese reside, and it is feared that the safety of our residents may thereby be affected, the Japanese Government may be constrained to take such self-defensive steps as the circumstances require.

Book Review

"Mather and Platt-Reyrolle" Automatic Rotary Converter Sub-station Equipment

Mather & Platt, Ltd., have sent us a most illuminating catalog of their new equipment, which they introduce as follows:—

As a result of the rapidly growing demand for an ample and cheap power service, not only for tramway and railway work, but also to an increasing extent for industrial and domestic supply, the power supply engineer is now daily confronted with economic and engineering problems requiring urgent solution. In carrying power to outlying and gradually growing districts, and in strengthening existing networks, he has often to decide whether to bury considerable capital sums in the form of cables or to erect numerous sub-stations, which in the early stages, at any rate, are usually small and uneconomical to operate. It is, therefore, only to be expected that an effort should have been made to find a solution of the problem which, while avoiding the large expenditure in heavy D.C. feeders, would also cut down the high running costs of a small sub-station.

For many years the Rotary Converter has taken pride of place amongst the available types of converting plant owing to its high efficiency. Steady improvements in design during the past decade have made the Rotary Converter equal, and in many respects superior to other types of plant in important operating characteristics other than efficiency. Especially is this the case as regards good commutation, high overload capacity, immunity from flash-over, good voltage regulation, ease of starting-up and setting to work, steady parallel running, and finally in that proven reliability which enables implicit confidence to be placed in its capability of running for long periods with very little attention.

During the same period the design of Switch-gear, and particularly that of Automatic Control Gear, has steadily progressed, and it is now recognized that most of the operations which the sub-station switchboard attendant has to carry out can be effected by purely automatic means more quickly, and with greater certainty and less risk of error in emergency than by manual control.

The *Automatic Rotary Converter Sub-station*, therefore, in many cases presents a complete solution of the supply problem. With its aid, small sub-station equipments housed in cheap and simple structures can be erected just where they are wanted, while the elimination of all human attendance—except for the occasional visits of the supervisor—enables the running costs to be greatly reduced.

The present booklet describes the Mather & Platt-Reyrolle Automatic Rotary Converter Sub-Station Equipment. This is the result of close collaboration between two British firms, Messrs A. Reyrolle & Co. Ltd., of Hebburn-on-Tyne, and Messrs. Mather & Platt Ltd., of Manchester. These firms are each in their own line specialists in the best sense of the word, and have built up world-wide reputations for the soundness and reliability of their products, and for the amount of care and thoroughly good work put into them.

The keynote of the Mather & Platt-Reyrolle Automatic Rotary Converter System is simplicity. In any development of this character there is a tendency to resort to complicated types of gear and methods of construction, and to multiply protective and other devices unnecessarily.

In the *Reyrolle* Control Equipment the Main A.C. Gear is of the well-known and well-tried metal-clad design. The means by which the essential functions of the various devices are carried out and safeguarded, are of the simplest possible character.

The utilization of the *Mather & Platt* Starting and Self-Synchronising System for Rotary Converters (discussed on page 22) has materially assisted in this process of simplification, since it provides a safe, simple and certain method of automatically synchronising which does not require the brushes lifting, and therefore dispenses with the complicated gear required for that operation.

The Equipment, in conception, design and manufacture, is wholly British.

The Future of the Philippines

THE death of Governor-General Leonard Wood has had the effect of leaving American policy in the Philippines without leadership. He represented the definite factor of what has been termed, American Imperialism. He believed that the Filipinos were incapable of governing themselves and that therefore, the United States having fallen heir to the islands, was bound to serve them as a father serves a child. In his last report of President Coolidge he said :

"The protection of those who can not protect themselves against unscrupulous caciques and politicians is one of the gravest responsibilities of the Governor-General."

It is absurd to presume that Governor-General Wood disliked Filipinos. Even his worst enemies now admit that he was a great Governor-General and a good man; that he served the Philippines, according to his lights, in all sincerity and with the best interests of the Filipinos at heart. That he did not always see eye to eye with the Filipino representatives is only natural. His was a military training; he sought efficiency and constructive development. He hoped that they might have independence at some time, but he wanted them first to be prepared for inde-

pence, which to him meant not only self-government but an ability to protect themselves, to defend their homes, to maintain their independence. He could not envisage a relationship of self-government for the Philippines, while the United States assumed responsibility for their defence. When the United States gave the Philippines to the Filipinos, he wanted the last American soldier to leave the place. And he, as well as Mr. Quezon, realized that that day was not yet.

He further quarrelled with them over their rather obscure economic policies. In the annual report already quoted, he called the President's attention to the importance of the economic problem. He said :

There still continues to be a lamentable lack of interest, which is quite general, in the economic development of the Islands with their enormous natural resources, as yet almost untouched, and an undue emphasis upon the importance of mere political activity largely serving immediate personal ambitions. There is also a failure to appreciate the fact that further extension in education, health, communications and public works is largely dependent upon economic progress.

Without placing an undue burden upon existing taxable values and business activities the present income of the government can not be materially increased unless larger taxable values are created and business is extended by the encouragement of the investment of capital, both local and outside.

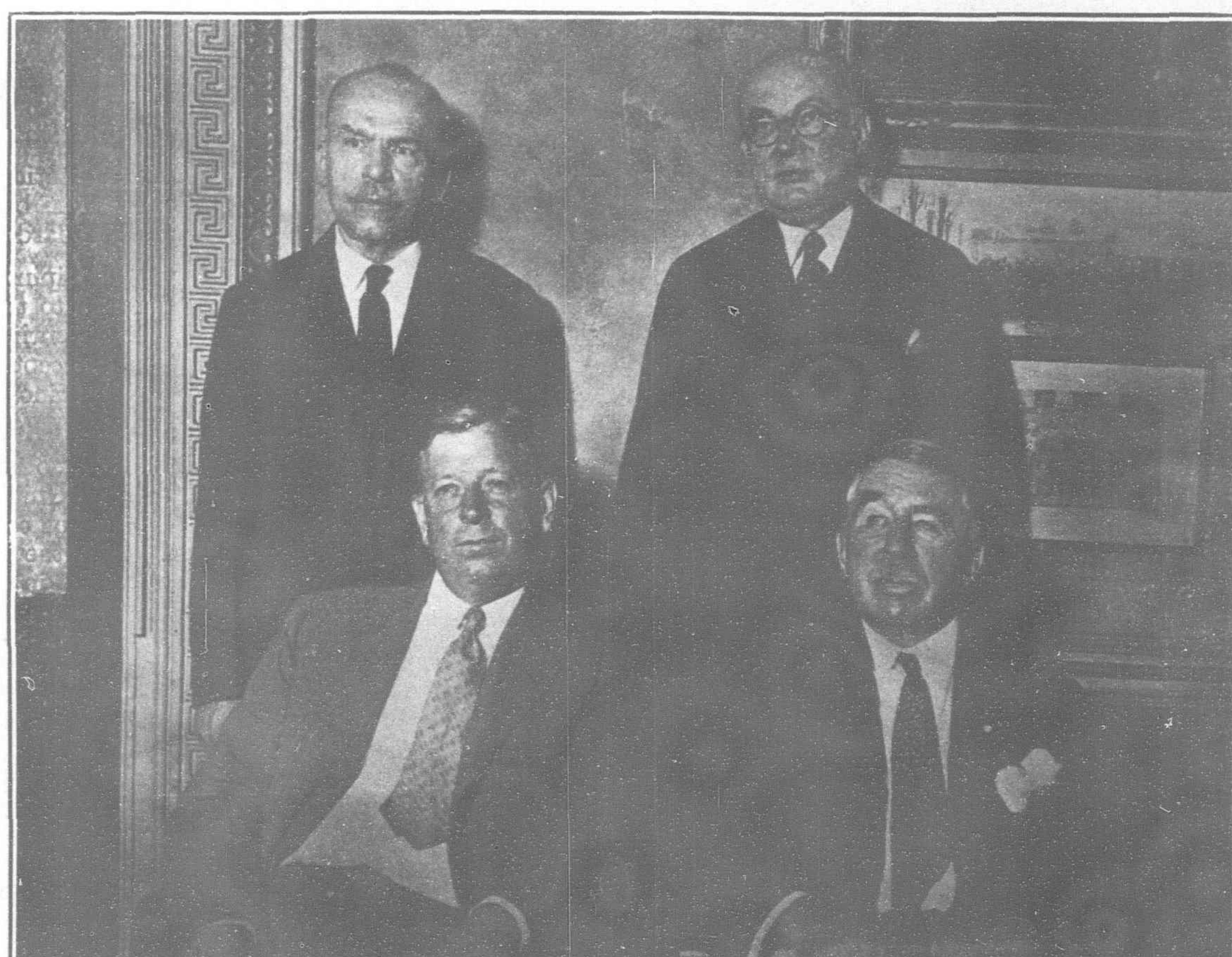
The Filipino economic policy was not merely obstructionist. They had actually worked out an idea, which has recently come to China from them. Succinctly stated their idea is that every dollar of American capital invested in the Philippines meant so much more insistence upon the part of American interests that the United States should retain the islands and so much more assurance that

the United States would retain them. They feared that their independence movement would fail because of the size of American vested interests in the Philippines. They admitted that their policy held the Philippines back; that it impeded progress and development; that their people were not as wealthy as they might be; that Government revenue was smaller than it might be. But their reply to all that was that they must get their independence first and then push on economically. To such a personality as Governor-General Wood,

their fears were unfounded. To him, the promise of the United States that the moment they were ready for independence they should have it, meant a sacred promise. But he conceived it his duty to make them ready by methods of American efficiency and upbuilding, which often offended them, because just as they often said that he did not understand them, so they seldom understood him.

He, therefore, was at odds with the political group in control. In his annual report he describes this political problem in much interesting detail, which may be reproduced here, because it sheds such a clear light on the situation in the islands *vis-a-vis* the United States :

Certain political leaders continue to stir up opposition to the administration and to misrepresent the purpose and policy of the American government. This is done largely for the purpose of getting votes and promoting local political interests. As heretofore, the Filipinos who have the larger permanent welfare of the people in view, and who advocate support of and



Major-General Wood Reports on Philippines Photo by Underwood & Underwood.

Left to right front row, Secretary of War Dwight Davis, Major-General Leonard A. Wood, back row, General Frank McIntyre chief of the Bureau of Insular Affairs and Rep. Edgar R. Kiess, Chairman of the House Committee on Insular Affairs.

co-operation with the American administration, are denounced as unpatriotic and as traitors to the Philippine cause. People as a whole, however, are becoming better informed as to the true situation and they are no longer so easily misled. A number of very prominent Filipinos, notably General Emilio Aguinaldo, continue to support the administration openly and strongly and have done a great deal to counteract the activities and destructive policies of those who advocate anti-Americanism and non-co-operation. Insular, provincial and municipal officials have in general shown a spirit of co-operation.

So long, however, as the cry that the administration is curtailing local autonomy and endangering the realization of ambitions for a separate political existence will serve vote getting purposes, it will continue to be raised, movements inspired by it will continue to manifest themselves and ambitious political leaders will use it for the preservation and promotion of personal and party political needs. While the cry is losing much of its potency, the year 1926 saw the effective use of it for the perpetuation of the control of the dominant political party and leader. At the beginning of the year there was formed the so-called Supreme National Council, composed of five members from each of the two political parties. This combination was effected on the plea that the existing local autonomy and the realization of the purpose to attain complete political independence were being endangered by the administration here and in the United States, and that the situation called for the sinking of all party differences and the unification of all elements in one organization under a small, compact control. The scope of the combination included not merely questions pertaining to the so-called "national issue" but to all matters of local concern. The dominant purpose of this combination was to preserve the existing political leadership by placing in the hands of these ten men the direct control of all political matters, including nominations for practically all elective offices and a determination of legislative policies. It was not a movement towards representative government and the building up of well balanced political parties, which has been regarded as essential to a stable government and which has been from the beginning of American effort here one of the main objects striven for. It was quite the reverse, and created, if not a one-man control, the control of a small oligarchy very largely under the influence of one man. The combination was still in existence at the close of the present year but there was multiplying evidence that its real significance and danger were becoming appreciated and that its ultimate break-up was impending.

There continues to be a determined effort on the part of certain political leaders to impress upon the American and Filipino people that the Filipinos are being ground down under an arbitrary and despotic government; that they have no effective voice in the management of their local affairs; that they are being displaced by Americans in the service; and that no government really satisfactory to the Filipinos can ever come from Americans. As bearing on the justification for this effort the following extract is pertinent from the report, printed in the Manila papers, of a public address delivered in March, 1927, before the students and faculty of Manila University, by Representative Claro M. Recto, a

prominent leader of the former minority party and a member of the special independence mission sent to the United States in 1924:

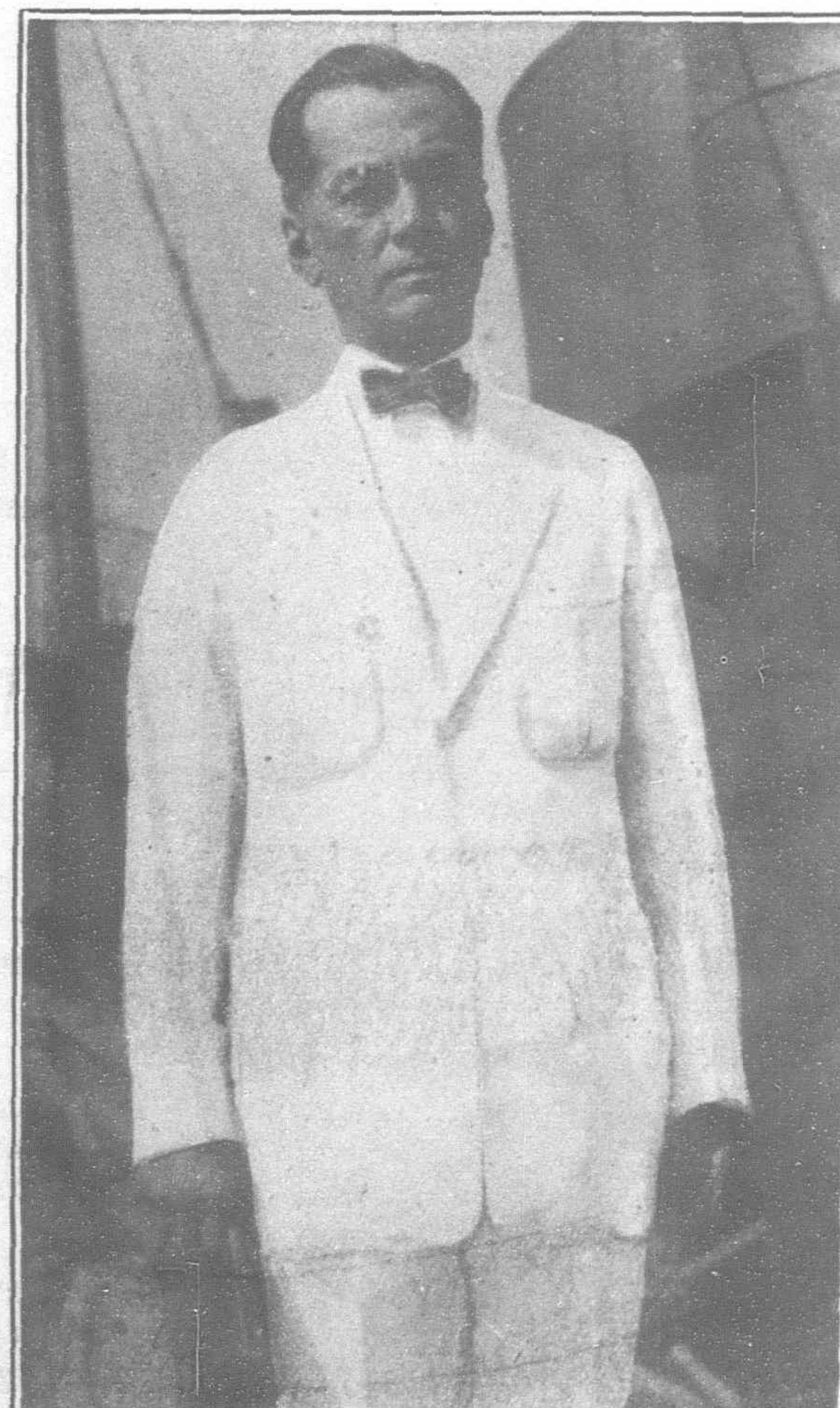
"Our people have grievances, and very serious ones too, against our American rulers. But they are of a political nature. They are grievances against the fundamental rights of every people to establish a government of their own. They are not grievances against the fundamental rights of man. The Filipino masses, desirous as they are of independence of their country, live nevertheless happy and contented, it is claimed by our American observers. They enjoy freedom of speech, of the press, of worship. The sanctity of the domicile and correspondence is respected. They are no longer robbed of their wives, of their daughters, of their homes, of their carabaos by predatory aliens. They have a system of laws which afford them the same chance as that afforded to the higher classes of the community to obtain justice and protection before the courts. They are assured of the fruit of their toil and trade. They go to the polls to elect their municipal presidents, their provincial governors, their senators and representatives. They have a system of schools leading to a state university for the instruction of their children, as well as hospitals and good roads. They travel safely from one point to another in the Islands. Public sanitation guards them from plague and disease. They are free from brigandage and their property and rights are carefully safeguarded."

If there is misgovernment, the Filipino masses can hardly understand how it can be attributed to the Americans when local and provincial governments are entirely in the hands of Filipinos. Department secretaries, except one, are Filipinos. Senators and representatives are Filipinos. The administration of justice is handled by Filipinos."

Since the death of General Wood, no successor has been appointed. It is altogether seemly that the United States should not appear to be in too great a haste to fill the office of so able a public servant.

But the failure to appoint a successor is in no small measure due to the fact that it is possible that a complete reorientation will take place in the American policy in the Philippines, which at any rate, deserves consideration and understanding.

Mr. Henry L. Stimson, who was at one time Secretary of War, has proposed that the relations between the United States and the Philippines be revised on the basis of the relationship of a self-governing dominion to a mother country. In a word, he would have the Philippines become to the United States what Canada is to Great Britain. It is possible that for some time, under this plan, the United States would exercise a supervisory and advisory control over Philippine finances, but ultimately the Filipinos would govern themselves under an American Governor-General. Insufficient details of this plan are at hand to discuss it fully, but the fact remains that when the Secretary for War suggested that Mr. Manuel Quezon, the Filipino leader comes to Washington with a delegation to discuss the problem, Mr. Quezon, Mr. Osmena and other leaders immediately accepted the invitation and Mr. Quezon expressed himself in hearty support of such a solution of the problem. In fact, he said that such a solution would permanently end the cry for independence and would solve all outstanding problems between the United States and the Philippines. It is this new development, which holds the scene at the moment.



Manuel Quezon President of the Philippine Senate

Japanese Trade-Mark Pirates Walk the Plank

Court Ruling Sets Precedent in Japanese Commercial Channels—Fraudulent Makers of Champion Spark Plugs Made to Advertise an Apology

COMMERCIAL parasites who prey on the prestige of reputable trade names may not in the future find Japan a fertile field for their depredations. There have been innumerable instances of fraudulent imitation of foreign trade-marks in that country, but with a recent decision in favor of the Champion Spark Plug Company the future of this pirate business looks anything but promising.

The decision of the Japanese courts sets a precedent which, it is expected, will go far toward removing a source of trouble which has hindered development of foreign trade and, not infrequently, has undone the work of years devoted to building up prestige in China and India as well as Japan. Such unethical practices, when viewed collectively-tend to have an unpleasant reaction on the character of a nation as a whole.

The far-reaching effects of these violators of commercial morality did not escape the vision of the Japanese courts. This recognition in fact is perhaps the most significant phase of the case.

Those who were arrested, attempted at the outset to influence the court in their favor, thinking probably that as light a view would be taken of the matter as they themselves took, but the public procurator, W. Ichiara, viewed the case differently, saying he would prosecute to the utmost extent of the law, inasmuch as the defendants had given no thought to the detrimental effect their actions might have on Japan's good name abroad.

The simple facts of the case, as reported by the *Kobi Herald* follow:

Recently the Shanghai agent of the Champion Spark Plug Company saw a sample which, while it was a good imitation, was not so good as to deceive him. He found it selling retail in Shanghai at half the price of the genuine article. Further inquiry developed information that the guarantee, container and advertising matter accompanying the plug were almost identical, with those of the Champion company, but one or two errors of spelling betrayed them. Investigation showed that the makers were located in Nagoya and had selling agencies in Tokyo and Osaka.

Certain men were apprehended and formally charged with misrepresentation of the place of origin and perpetrating fraud in the use of another's trade-name and place of manufacture. Action was taken by A. F. Cahusac, registered patent attorney of Tokyo, under the International Convention regarding unfair competition, but the Nagoya court prosecuted the accused under the Japanese Criminal Code.

Ten days were allowed the fraudulent manufacturers to think matters over. When a final meeting was held with a representative of the Champion Spark Plug Company, it was necessary to requisition a private hotel reception room to hold the gathering of those implicated.

The dealers involved were thoroughly alarmed and their consultation lasted for thirty-six hours almost without a break. The proceedings were tense and relief was felt when it was decided not to expose the dealers' names, but only those of the illicit manufacturers. With the filing of the brief against the manufacturing concern and the exporters of the illicit product, steps were immediately taken to secure the outstanding stocks and prevent further selling. Subsequently, the delinquent dealers undertook to deliver all the imitation goods on the market within three weeks, to be stored at a place designated by Mr. Cahusac's office.

It was agreed to omit the dealer's names from the advertised apology, as it was decided that publication would not materially help the principals. On the contrary, it would bring ill-repute on the dealers once it was publicly known that they had handled the imitation goods. Naturally, this would only add further damage in the distribution of Champion plugs.

Minus the names of the dealers, the public apology was advertised for two consecutive days in four newspapers at Tokyo, two at Osaka and at Nagoya, and one in Kobi. The cost of this advertising was paid by the imitating makers and the dealers.

The agreement between the Champion Spark Plug Company and its spurious imitators has aroused so much interest that it is given below:

- (1) Champion Spark Plug Company of Toledo, herein designated as "A," in consideration of the articles of agreement hereinafter set forth, agrees to withdraw the several criminal suits filed against the Daiichi Jidesha Kumiai, hereinafter designated as "B" and certain dealers hereinafter designated as "C."
- (2) "A" agrees to waive all claims for damages, other than may appear hereinafter.
- (3) "B" and "C" agree to deposit the sum of Y.10,000 for performance of this agreement in any bank designated by "A," said deposit to stand in the name of Champion Spark Plug Company and one other party named by "B" and "C," said deposit to remain for a period of one year.
- (4) "B" and "C" shall cause a public apology to be printed in certain newspapers, at their expense.
- (5) "B" and "C" shall deposit the sum of Y2,000 in cash with A. F. Cahusac for a period of one year to defray preliminary expenses that may be caused by failure of "B" and "C" to carry out this agreement.
- (6) "B" and "C" agree to hand over to "A," or its attorney, A. F. Cahusac, all spark plugs in stock in Nagoya, Osaka, Tokyo and Yokohama, and shall make every effort to secure all such plugs from other places. Said delivery to be made within three weeks.
- (7) "B" and "C" agree that Y5,000 shall immediately become forfeit on the failure of either "B" or "C" to carry out this agreement, and the sum of Y10,000 become forfeit if both default.
- (8) "A" agrees that the dealers mentioned in this agreement shall not be discriminated against in respect of handling genuine Champion Spark Plugs.
- (9) "B" and "C" agree that "A" shall immediately publish at the expense of "B" and "C" any infringement of the article of this agreement.

Although the provisions of this agreement are being followed to the letter, the defendants are not relieved of their difficulties. In addition, the Public Procurator has notified the complainant that the accused must face trial in the local court under the criminal code.

All the business interests of Japan have keenly followed every detail of the case. Widespread satisfaction is expressed with the outcome. Great concern has been felt over the boldness and the extent of unfair trade practices and it is felt that the way is now open for straight-arm dealing with these pirates.

The feeling is summed up in the comment of the "*Japan Advertiser*," which states:

"The results accomplished in this case of glaring fraud wherein certain parties, who are entitled to be called business men, deliberately set out to copy identically and in its entirety a product of a well-known manufacturer may well be considered a milepost in commercial Japan. As far as is known, it is the first case where a complete and definite surrender of all parties to the fraud has been recorded..."

"Cases of this kind have been only too common and numerous in the past, and it is to be hoped that this is only the forerunner of concerted action to stamp out the illegal practice of palming off local manufacturers as imported goods and to put an end to incalculable damage not only in Japan but in the entire Far East, to manufacturers who have spent years and fortunes building up reputations, only to have them destroyed in a few months by unscrupulous practices. In this particular case fraudulent goods have been shipped all over the Far East and have practically destroyed the work of years in as far away markets from Japan as India."

Work of British Banks in China

By E. M. Gull, Late Secretary of the Associated British Chamber of Commerce in China

THE essentials of this subject are best reached through figures indicating the significance of the embargo which the Nationalist Government at Nanking has placed on the export of silver. In 1926 shipments of silver in the form of bars, sycee and dollars from Shanghai to other ports and cities in China (including Hongkong), totalled bars 35,939, sycee, Tls. 5,080,000 and \$64,000,000, their chief distribution being as follows:—

BAR SHIPMENTS.

Place	Amount
To Hangchow	21,988
Nanking	13,142
Hankow	625

SYCEE SHIPMENTS (*i.e.*, Shipments of silver in the form of ingots).

To Hangchow	1,450,000
Hankow	1,200,000
Nanking	950,000

DOLLAR SHIPMENTS.

To Hongkong	14,600,000
Hankow	6,450,000
Tientsin	6,100,000
Amoy	6,050,000
Swatow	5,550,000
Tsingtao	4,750,000

Most of the bar shipments went to the mints for coinage purposes, and represent the needs of commerce indirectly. Most of the sycee and all the dollar shipments went to their various destinations to finance trade as required, a large proportion of the dollars being used to pay for silk, cotton, seeds and other commodities intended for export abroad. And as a large proportion of all three classes of shipments constituted withdrawals from the vaults of the British banks, both the relation of those institutions to the economic life of China and the extent to which the Nationalists at Nanking are interfering with trade become at once apparent.

Banks and Currency

The banks are called exchange banks, and their primary function is to enable China, a silver-using country, to sell to and buy from countries the majority of which use gold as a medium of exchange.

The circumstances in which the British institutions perform this function, however, place them (as the figures given above illustrate) in a peculiar and highly responsible position in relation to the country's monetary needs, which were thus described in 1919 by the late Mr. A. G. Stephen, manager of the Hongkong and Shanghai Bank at Shanghai.

"Until a mint is provided in which the foreign banks have confidence these banks cannot possibly recommend their Governments to agree to the abolition of sycee, which is the sheet anchor of China's currency at the present time. Both the Government and the provincial banks have issued notes so recklessly that this form of currency is entirely discredited. Each provincial mint has been a law unto itself and has coined enormous quantities of sub-silver and copper coins of various weights and fineness; in fact, those in charge of the mints have undoubtedly used their position for the purpose of making money for themselves. The result is, naturally, that the subsidiary coinage of China does not command the confidence of the meanest coolie, and the variations of its weight and fineness provides a living for, it is said, 2,000 exchange shops in Shanghai alone."

Note Issues

As a hopeful indication in this picture of disorder, Mr. Stephen described the way in which dollars minted by the Nanking Mint were circulating all over northern China and penetrating into Manchuria and Mongolia, but he was not able to describe them as

being more than "fairly reliable," and at the conference of Chambers held in the following year Mr. G. H. Stitt, his successor, referring to variations between dollars minted in 1920 and 1919, said: "Dollars as variable as these are not coins in the technical sense, for they have no definite intrinsic value. At the best they are but a commodity whose expressed value in the accepted tael unit must fluctuate considerably."

Thus it comes about that foreign banks in China are compelled—not through the "unequal Treaties," to which, of course, the Nationalists ascribe foreign financial influence, but through the chaos which characterizes the country's financial as well as its political affairs—to keep stores of sycee and to issue notes of their own. Total imports of silver into Shanghai in the form of bars in 1926 were 71,929, about 70 per cent. of which were imported by British banks, the approximate total of their note issues in China (including Hongkong) being £7,590,000.

If to-morrow the "unequal Treaties" were abolished and all the foreign banks in Shanghai disappeared, leaving the field clear for the native banks, there would be no reliable notes on the market, because there would be no guarantee of any cover for them, while trade would be left without any secure basis in the form of reliable silver supplies available when wanted. That is being illustrated at the present time when, in consequence of the embargo, it has been found necessary to ship silver to Tientsin in a British gunboat.

Shanghai Sycee

An extremely important element in this reliability, which the foreign banks help to maintain, is the honesty of Shanghai sycee. Sycee, as explained above, is the term given to silver in ingot form, the form differing in different parts of the country. In Shanghai ingots are in the shape of shoes, weighing close on 50 taels, each tael containing 524.93 grains of fine silver. The production of a shoe is the result of a highly skilled operation performed in what to the onlooker seems a very rudimentary manner, under the supervision of an institution known as the Kung Ku Chü, a public office, but free from Government control, at which anybody in possession of sycee can have its fineness tested and guaranteed at the cost of two tael cents a shoe. Sycee bearing this institution's "chop" and stated by it to be silver of a certain fineness, contains precisely that amount of silver, no more and no less. The Kung Ku Chü is not in any formal sense controlled by the foreign banks, but their watchfulness and precision help to keep it up to the mark, and as it works inside the International Settlement it enjoys the protection which foreign banks themselves enjoy.

Banks and Trade

The story of British banking in Shanghai goes back to 1848, when the Oriental Banking Corporation, now defunct, opened a branch. Of the existing banks the oldest is the Mercantile Bank, which opened in Shanghai in 1854. In 1858 the Mercantile Bank of India was incorporated under Royal Charter as the Chartered Mercantile Bank of India, London and China, a title changed in 1893 to the Mercantile Bank of India, Ltd. From 1894 to 1915 the branch was run as an agency in the offices of Messrs. Jardine, Matheson and Co., Ltd., reopening as a branch in the latter year. The Chartered Bank of India, Australia and China, opened in Shanghai in 1857, the Hongkong and Shanghai Banking Corporation in 1864, and the P. and O. Banking Corporation in 1920.

In 1865, when the first balance-sheet of the Hongkong and Shanghai Banking Corporation was published, China's total foreign import trade was valued at Hk. Tls. 84,160,000, or (at Hk. Tls. 3, the average rate of exchange that year) £28,050,000. Of this total Shanghai's importations were valued at about £11,000,000.

In 1925 (the 1926 figures are not yet available) China's total import trade was valued at Hk. Tls. 965,000,000, or about £168,388,000, Shanghai's importations being valued at Hk. Tls. 431,887,000, or about £75,340,000.

The total of bills receivable and discounted in 1926 by the four British banks doing business in Shanghai was over £109,000,000, a large proportion of this total representing business done in that port.

Important Point

While there is no occasion to labour what these figures plainly tell, their significance would not be fully appreciated without realization of the fact that *the part played by modern Chinese banks in China's foreign trade is, as yet, small.*

Some 23 are members of the Chinese Bankers' Association, but the foreign trade they finance is but a small fraction of the figures shown above. At the present time, when extreme Nationalists in China are making a "dead set" at everything British, it is important that this fact, and the chaotic condition of China's currency, should be known and understood. Consideration of Chinese affairs has tended to centre round the effects on our trade of boycott to the exclusion of the consequences of allowing the Chinese to "jockey" us out of the safeguards essential to sound finance. Among these are freedom from Governmental interference of the processes whereby bar silver is converted into sycee—the "sheet anchor," as the late Mr. Stephen described it, of the

monetary position in Shanghai (a freedom which would disappear if the Chinese were given in the international settlement the powers which they have been given in the ex-British concession at Hankow), and amenability of our banks to British and not to Chinese laws. Let either of these safeguards be removed and our losses will be far greater than those inflicted on us by boycott. Some day, everybody hopes, the Chinese will have a decent Government and a reliable currency.

Present Protection

At present they have neither, and until they have it is absolutely essential that our banks should continue to enjoy the protection which extraterritoriality and foreign administration of Shanghai give them. In saying this one is not thinking only of the prosperity of the banks and of the foreign commercial concerns which they have helped to create, and with which their own prosperity is bound up, one is thinking also of China's prosperity. Her trade, her railways, her growing industrial concerns, all these are the fruits of Sino-foreign, and to a large extent of Sino-British, co-operation under certain conditions. Destroy those conditions at this premature stage, and co-operation will not be made easier and more productive; it will be made harder and less productive.

British Trade and Industry

By Gilbert C. Layton, Assistant Editor of "The Economist"

(SPECIAL TO THE "FAR EASTERN REVIEW")

The Iron and Steel Outlook

Despite the fact that August is the height of the holiday season, the iron and steel world has not been uneventful. Manufacturers are evidently making a determined effort to meet foreign competition. The Cleveland iron-masters have announced a reduction of 2s 6d per ton in the price of Pig-iron, together with an additional reduction of 2s 6d per ton on export orders of a minimum of 500 tons. This follows other reductions made during the year. Moreover, steel-masters have instituted a rebate scheme under which consumers who buy only British products will receive in the form of rebates substantial presents from time to time. It is clear that the imports of iron and steel are a serious menace to home manufacturers for these continue at the high rate of about 4,000,000 tons per annum. Whether the price-reduction will have the desired effect remains to be seen. It has certainly stimulated some buying in domestic circles, but August is not a fair month by which to judge results. The Stock Exchange, at any rate, has placed a favorable interpretation upon the move. The majority of the iron and steel shares, in common with many other industrials, have advanced in the past few weeks and there can be no doubt that there is a danger that the upward movement will be overdone, if this has not already happened. It must be remembered that many British iron and steel companies have not only paid no ordinary dividends for some time past, but they are also in arrear with their preference dividends, while recent allocations in respect of depreciation have not been generous. Obviously they will need a fair period of much better times than the present before they will be able to resume their ordinary dividend payments. Meanwhile, it is significant that the monthly production figures of iron and steel continued to show a declining tendency. The pig-iron production dropped from 651,300 tons in June to 645,800 tons in July and the steel production from 747,300 tons in June to 687,100 tons in July. At the time of writing it is too early to predict the autumn prospects with confidence, but it is noteworthy that there is no trace of conspicuous optimism in the producing centers.

The Coal Position

There is little change in the coal situation. If anything, the gloom has deepened. The Spanish Government decree imposing a licensing system on imports has disturbed British exporters, but it is possible that the importance of the Spanish market has been exaggerated. The British exports to Spain for the first six months of this year amounted to approximately 1½ million tons. This

further outbreak of economic nationalism, however, is certainly deplorable, since it does not help—to put it at the very lowest—the urgent work of the economic rehabilitation of Europe. The sensitiveness of British exporters to conditions abroad is perhaps due to the unpromising domestic situation. The output has recently been on a lower scale. At no time since the end of June has the weekly output reached five million tons, and since the middle of July the number of wage-earners employed has remained consistently below one million. It is true that demand has generally sufficed to absorb the reduced quantities of fuel available, prices being steady and the market having a better tone.

But no one can pretend that this is a satisfactory state of affairs. Indeed, we seem to be drifting back to the conditions that preceded the great strike of 1926. Meanwhile, the Government, the owners and the miners are unable, or unwilling, to make a solitary move to save the situation. The only obvious hope for the industry lies in the systematic rationalisation recommended by the Samuel Commission but the main proposals of that Royal Commission are being neglected by all parties concerned. It is to be hoped that the approach of winter will awaken at least one of the interested parties to the need for action. It is satisfactory, so far as it goes, that a large group of anthracite collieries in South Wales have appointed a well-known firm of coal factors as their sole selling agents for home and foreign markets. Greater efficiency in marketing, it will be recalled, was one of the recommendations of the Samuel Commission.

Combines in the Electrical Industry

The electrical industry in this country has been frequently subjected to the criticism that it has lent itself unduly to the formation of "rings" and "combines," intended to maintain prices and control production. This criticism is answered and the electrical industry is studied, in detail, in a volume entitled "Combines and Trusts in the Electrical Industry," published by the British Electrical and Allied Manufacturers' Association. It is pointed out that the electrical industry has, through effective combination and the observance of reasonable standards of production and price, maintained its position against foreign competition of the most determined nature; it has become the leading export branch of the engineering industry and has brought this country easily into the first place among the exporters of the world in electrical goods.

But the view is expressed that, if it is to retain this position, it must be prepared for action, for it has still to meet the competition

of international groups with very great financial and political resources. Two possible courses are indicated : either to form closer associations with German and American manufacturing concerns, and so become absorbed in the international combine which may be formed ultimately, or to tighten up its own organisations, form a compact group of manufacturers with a common policy both in manufacture (prices and orders) and in finance and at the same time strengthen the central association. It cannot continue in the present

system—where too much concession is still made to the theory of individual concerns with individual policies and badly-regulated conditions of production and price—and remain in existence. The industry can meet the conditions that make action necessary if it combines now much more effectively than hitherto, but, on a conservative estimate, it has not more than two years in which to effect the necessary changes before the testing period will come. It is not a question of technical but of administrative efficiency.

China as Osaka's Customer *

By Dr. M. Takayanagi, Hogaku-hakushi, Chief Secretary, Osaka Chamber of Commerce

IN the foreign trade of Japan, the United States ranks first, being followed by China, British-India, England, Australia and Germany in that order. Trade with America occupies 40 per cent. of the total amount of Japan's foreign trade, while China trade makes up 20 per cent., the other countries being far behind.

China trade has great effect upon this country solely with regard to this enormous volume. The second point of significance of Japan's Chinese trade lies in the fact that whereas with the United States the export is almost balanced by the import and with other countries our import almost invariably exceeds the import, with China it is always the exception the export exceeding the import every year to a considerable degree.

Now that statistics show an excess of import of several hundred millions each year in our foreign trade in general of late, which is considered a deplorable phenomenon in view of Japan's international relations arising from loans, it is a very satisfying fact that with China the export continues to exceed the import.

Thirdly, it must be emphasized that, while our American trade is principally carried on through Yokohama, the chief trading port for China is Osaka. Thus nobody hesitates in asserting that Osaka finds in China its most important customer.

Now let us consider in what trade relation Japan is with China. In 1914, just on the eve of the World War, our China trade, including Kwantung Leased Territory and Hongkong, was Y.217,000,000 in export and Y.8,000,000 in import. The figures have increased until it reached Y.549,000,000 in export and Y.355,000,000 in import last year. In these twelve years the export has expanded by two times and a half, while the import has been quadrupled.

Then, what part is played by Osaka in Japan's China trade ? In 1914 the export was only 70,000,000 yen and the import was Y.8,000,000. Last year experienced an enormous increase of exports to Y.295,000,000 and that of imports to Y.65,000,000. Osaka's export thus was more than quadrupled and its import was made eight-fold. Does not this fact prove the marvellous development Osaka has realized in its China trade ?

Osaka's China trade now occupies nearly 40 per cent. of the total volume of Japan's trade with China as a whole. When Osaka's trade with China carried on through Kobe as a result of steamer facilities and other circumstances is added to the above amount, we come to the conclusion that at least 60 or 70 per cent. of the Chinese trade of Japan as a whole is held by Osaka.

We shall now consider the principal articles of trade of Osaka with China. In export cotton yarn and sheeting, needless to say, rank first in exports, making up 70 or 80 per cent. of the total volume. They are followed by sugar, iron goods, paper and paper articles, glass, mirrors, brass and yellow copper, umbrellas, spinning machines and tools, and others, all of which amount to over Y.1,000,000 each every year. Besides, there are too many articles to be enumerated the export amount of each of which does not reach 1,000,000 yen.

As regard imports from China, it is rather astounding that the first place is occupied by beef which amounts to about Y.3,400,000 annually. No wonder Osaka is popularly believed to be doomed to ruin through an extravagant diet (beef is still considered in Japan as a luxurious food). This large amount of beef imported from China, needless to say, is not consumed in Osaka only ; a pretty large quantity is sent to other localities. As to provisions, beef is followed by eggs in the quantity of import ; Osaka purchases eggs from China annually to an amount of about Y.2,400,000. Next to eggs mention should be made of cotton-seed, rape-seed, poppy-seed, hemp-seed, cow-hides and other hides, swine-hair, cotton,

hemp and ramie, wild-cocoon yarns, and others, each of which amounts to over Y.1,000,000 per year. They are all consumed as raw materials for industrial purposes.

Osaka imports from China provisions and raw materials in exchange for the export of manufactured goods, and a greater part of the Osaka citizens, not to speak of merchants and industrial men simply, are living on the China trade, with which they are more or less connected.

How is Osaka carrying on its China trade ? There are two kinds of China trading : one through the medium of the Chinese traders resident in the city, and the other by Osaka merchants personally going to China. The first category is represented by the Kawaguchi trade or the Settlement trade, popularly so called.

Chinamen's trade with Osaka originates in their business through Sakai in Izumi Province in olden times, and their first immediate trade relation with Osaka is recorded as having been started around the 3rd year of Meiji (1870). The first Chinese who came over and settled Kawaguchi in Osaka were mostly from Canton, Foochow and other districts in South China. They bought stock in Osaka principally of isinglass, shark-fins, dried sea-cucumbers and dried shrimps and other marine products, which they exported home in exchange for sugar, rice and other cereals, drugs, spices and wood.

After the Sino-Japanese War many Chinese came to Kawaguchi; particularly since the Russo-Japanese War the entry of those from North China too has considerably increased. According to the statistics of last year, there now reside in Kawaguchi 1,343 Chinese merchants whose business transaction with Osaka men has been enhanced in its quantity as well as in the variety of goods dealt with. Historically speaking, the so-called Kawaguchi trade has evolved from the trade in marine products into transactions in cotton manufactures and sundries within the last six decades. The trade in marine products has to-day been substituted by Nagasaki, Moji and Hakodate ports, Osaka now prospering in trade in more improved manufactures of various kinds.

The Chinese shops in Kawaguchi are to-day not more than three hundred involving a little over 1,300 persons, as above-mentioned, but it is a striking fact that they annually handle the large amount of exports of Y.125,000,000 and of imports of Y.3,000,000.

These Chinese traders are organized into two Chambers of Commerce, North and South Chinese, and engage in wholesome business on the basis of commercial morality and mutual credit. On the part of the Japanese merchants who take part in the Kawaguchi trade, they have also organized a Trade Association more than ten years ago, so as to maintain reciprocal credit with the Chinese dealers and to consolidate themselves against unjust competition. The result is that both native and Chinese merchants are in very intimate commercial relationship.

The number of Osaka people belonging to the second category, who go over to China for trading, is not exactly known, but their activities may be traced back to the wake of the Sino-Japanese War, and through the Boxer Trouble, the Russo-Japanese War and the Great War they reached an enormous number for a time in Shanghai, Hankow, Tientsin, Tsingtao and Manchuria.

Strange as it may seem, however, few Osaka individual traders who have established themselves in China have succeeded in their business ; we often hear their enterprise has ended rather in failure. Then, what reason is there for the Chinese merchants in Kawaguchi gaining such success in Japan, while the Japanese going to China are achieving no satisfactory results ?

* "The Japan Magazine," Oct., 1927.

China's Future Motorcar Civilization

Country May Not Need to Build Railways

TO those who have listened for the last quarter century or so to the laments of the expert on China who bases much of his pessimism on the deplorable lack of communications, the present revelations of ways and possible means for this primitive country to reach within a few years a stage of development in transit

that would assist materially in its unification and make up for the lack of railways without the huge and precarious investment of foreign capital hitherto required will sound like a message pregnant with hope.

Due to the tremendous progress recorded in motor car transportation recently in America, where truck lines are competing successfully with the railways and the trans-Continental auto Pullmans are operated on regular schedules, the imagination of those who have long been seeking a solution for this vital problem in China has been stirred afresh. The image at once arises of similar lines, linking all the principal cities in China, and there are indications that this is gradually assuming material form.

"Imagine America," said a noted New York correspondent in Shanghai, "with no railway lines west of Chicago and none South of St. Louis, and you have a picture of China." This he said by way of explaining the apparent impossibility of a unified China. But supposing that instead of building railways, China should build a few goods roads, affording means of transportation for all classes of vehicles and allowing also the rapid long-distance transit that is so eminently desired.

Bus lines already have transformed the map of China in the north. It is by means of motor transportation that the only line of communication across the Gobi desert exists and trade is carried on regularly from Kalgan to Urga, to Chita, and Urga to Hailar and Manchouli by trucks, and converted passenger cars, flippers and motor vehicles of every description. Supplies for armies, valuable furs and traders have been moved on these auto caravans of the desert, and like the days of the "prairie schooners" in the West of America, their operation is not unattended by adventures of the penny-dreadful type. Then, too, there are jitney services in Harbin, Mukden and other parts of Manchuria, reaching the outlying districts of these cities and in some cases, as in America to-day, serving as feeders for the railways. In Harbin, which was without any trams until this year, the only public means of transportation has been for years by automobile.

But virtually all of these lines have been run with ordinary passenger cars, or else with automobiles with a truck body improvised on the chassis, and the only large autobusses running in China are in Shanghai and Hongkong. Several lines in each city

are in operation, carrying hundreds of thousands of passengers annually. Another line recently was started in Amoy, with buses furnished by the China Motors, the bodies of which were built in Shanghai. Another significant development, a by-product of the war along the Yangtze, is the building of several hundred

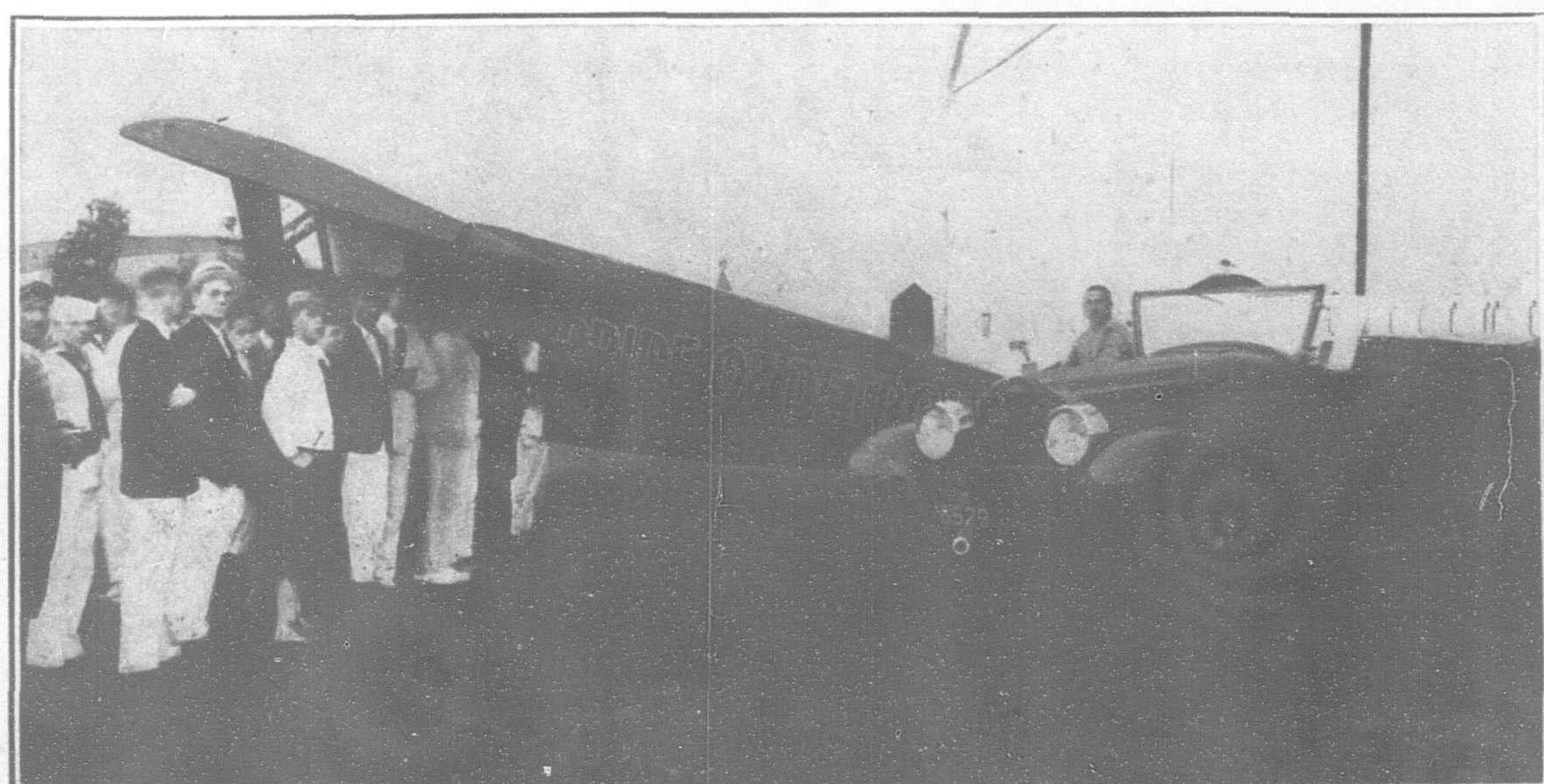
red miles of first-class military roads in the vicinity of Hankow and Nanking, and running from these centers to important points in the interior, but so far without linking any of the largest cities, such as a Canton-Hankow highway. The Nationalist Government, however, has recently purchased a fleet of trucks, shown in one of the illustrations, for use in the interior.

The lack of roads, in fact, has been the only limitation to an expansion in the automotive industry in China and the general adoption of auto transport. The present road mileage, not more than a few thousand miles, is in proportion to the pitifully inadequate railway mileage. Out of China's enormous area of 1,896,000 square miles, the railways are only approximately 7,700 miles.

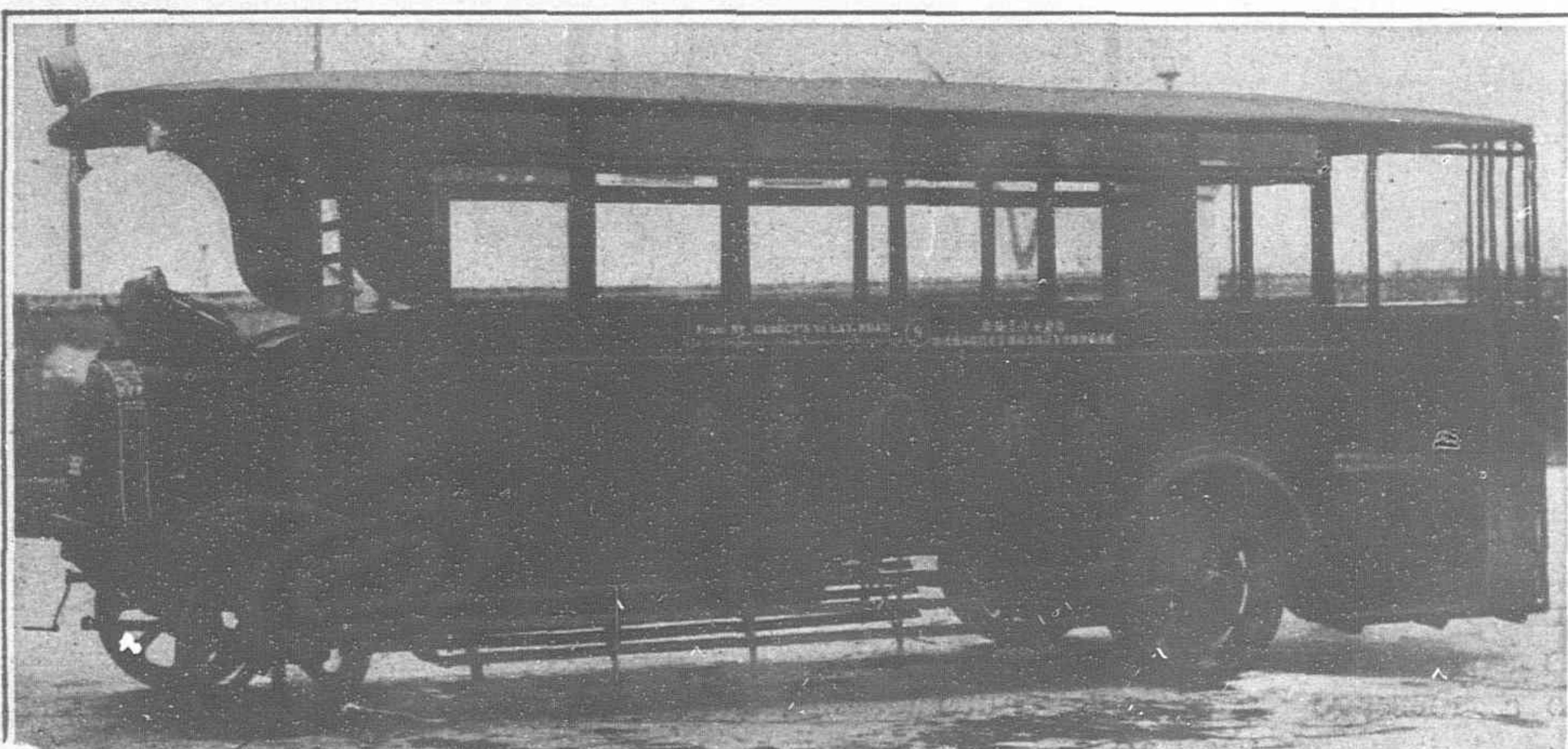
To cite but one instance of the way in which parts of China are becoming sufficiently modernized to adopt motor transportation, there is the amazing development of the China General Omnibus Company operating all the buses in the International Settlement of Shanghai. Started in 1914 with a few cars, this organization in the first ten years expanded to more than fifty large passenger buses, travelling on four routes covering about twenty miles and every year brings new accretions in rolling stock and extension of the routes. Also in Shanghai, in the French Concession, there is a bus line with a similar story of growth. Statistics on the lines operating in Kowloon are not available at the present moment, but it is certain that the lines there have been equally successful.

Much of the equipment of these lines is manufactured in Shanghai, only the motors and chassis being imported. And in this connection it might be well to note that only the barest shreds of an automotive industry exist in China. There was a body factory in Shanghai several years ago which turned out thousands of cars, but the competition with imported cars forced suspension. Leon Friedman, the head of China Motors, is authority for the statement that it is cheaper to pay the freight on whole cars than to attempt to build the bodies in China, despite the lower labor costs here. The result has been that only here and there are shops to be found engaging in piece work. Weeks and Company, for example turned out the bodies on most of the buses first purchased by the China General Omnibus Company. The demand is not sufficiently heavy at the moment to support even the infancy of a manufacturing business. There are no shops, for example, dealing in special lines of automobile equipment, and the successful dealer in China almost invariably runs a taxi or rent-car service, a repair shop, for all kinds of work, and indulges in every other branch of the trade.

This phase of the business is not so significant; the significant developments are that each year a few hundred miles of roads are added to China's few thousand, probably not more than 4,000, mostly in Shantung and Chihli, at the present; that the Nationalist Government is interesting itself in the problem of building better roads; and has already put to its credit a few highways in the neighborhood of Canton; that the establishment of the bus services serving principally Chinese proves conclusively the potential hold



The Pride of Detroit.—Hungjao Field, Shanghai. Daybreak, September 11, 1927.



One of the Largest Buses in use by the China General Omnibus Co., in Shanghai.

motor transportation may have on the Chinese masses; that a campaign actually has been started by a group of the most prominent Chinese in Shanghai, having a membership of 120,000 Chinese in the various provinces, sponsored by Dr. C. T. Wang, Wong Ching-wei, Quo Tai-chi and other leaders, working solely to the end of better roads nationally.

Mr. Mark Moody, a prominent American engaged in the automobile trade in Shanghai has written on this subject as follows:

Perhaps the greatest obstacle now standing in the way of the development of motor transportation in China, is the lack of

roads, together with the lack of understanding of the possibilities yet unrealized. The first recognition of the value of the motor transportation in China probably has been by military authorities. They have realized the great importance of communication and transportation in controlling areas and have employed motor cars and trucks to advantage. Naturally, they had to complete roads upon which to operate, and many of the roads are little more than rude trails. When they have actually built good roads they will then realize the great economic value of these roads in peace times and the influence of the roads on prosperity.

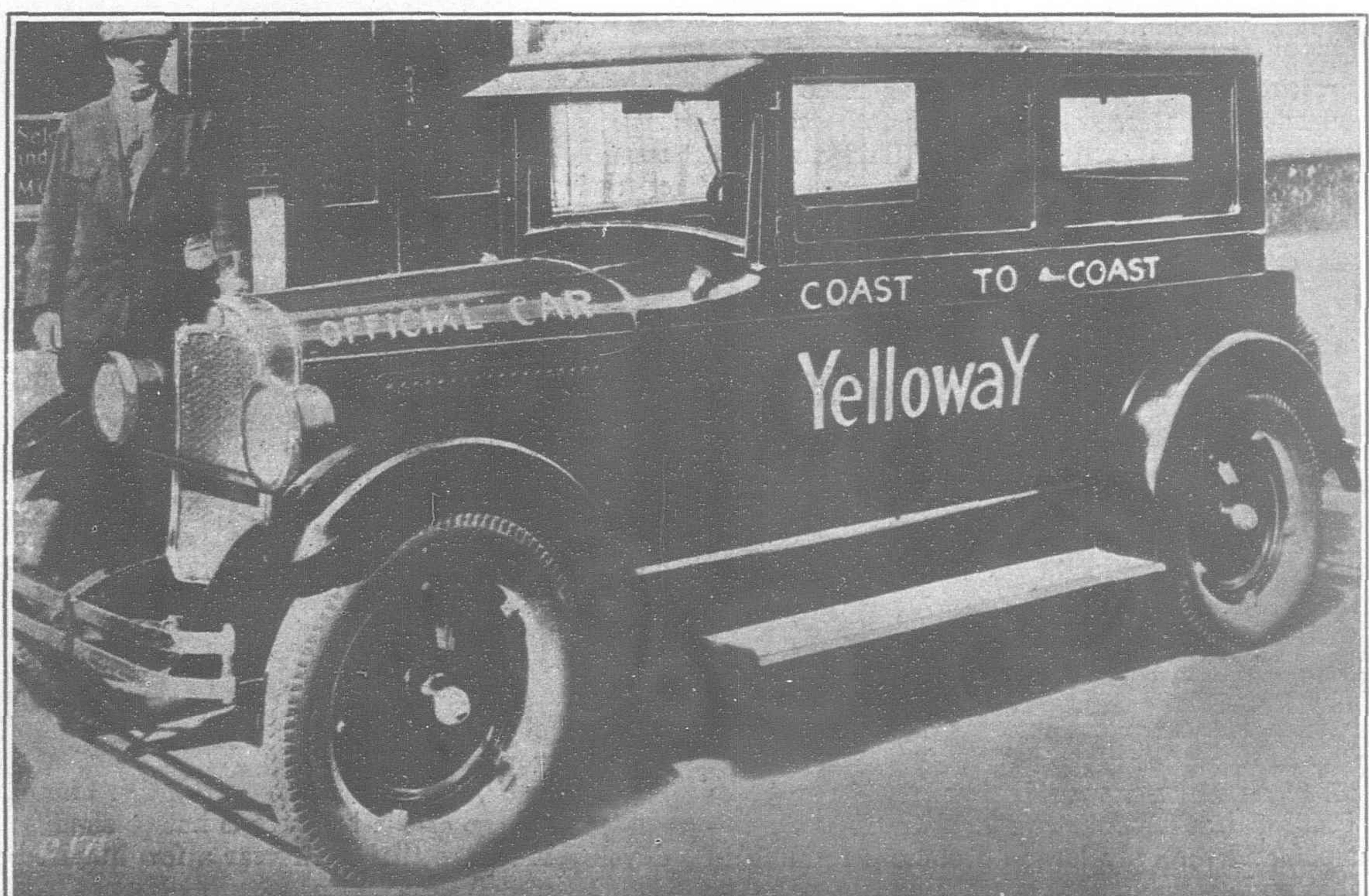
There have been several attempts to put a high duty on motorcars and a heavy luxury tax as well.

Having due consideration for the commercial, social and humane aspects of the development of motor transportation throughout China, I cannot refrain from saying that I believe that such a duty would be a grave mistake for China.

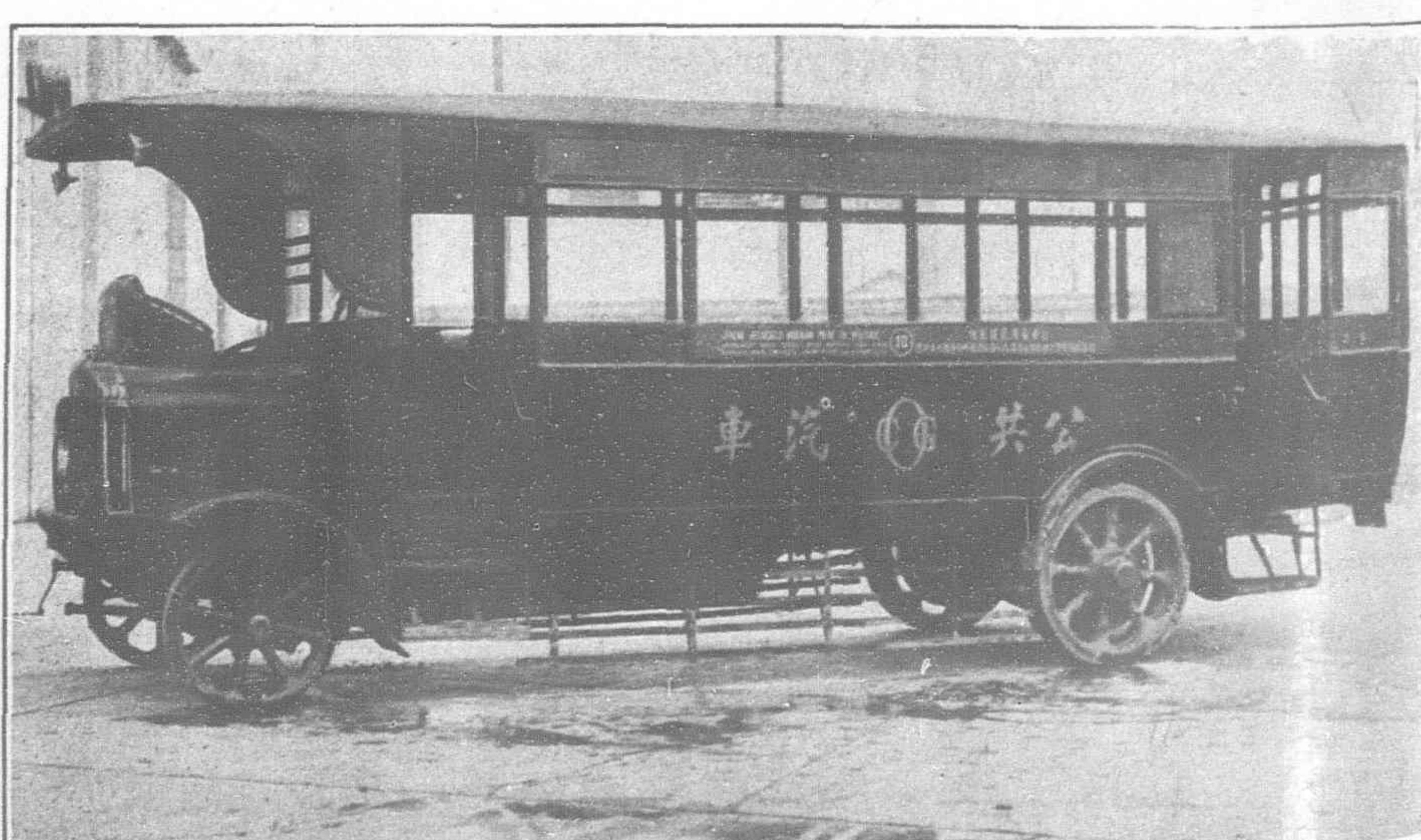
It is only logical to assume that the proposed legislation is fostered in the hope that it will increase customs revenue but careful thought on and analysis of the subject leave room to believe that the legislation would defeat its intended purpose. I believe that the few cars and trucks which would be imported under the high duty would not return as much revenue as realized on the volume imported at the present rate of duty. The proposed measure is not of a protective nature, there being no industry of an allied nature in China and it is an international precedent that duties on motor vehicles are based solely on the protection of home industries which fact constitutes the full recognition of nations of the sole utilitarian nature of the motor vehicle. The social and economic development of the nations of the world is directly traceable to the development of transportation, making for free commercial intercourse and

producing a medium of exchange of thought, ideals and aspirations.

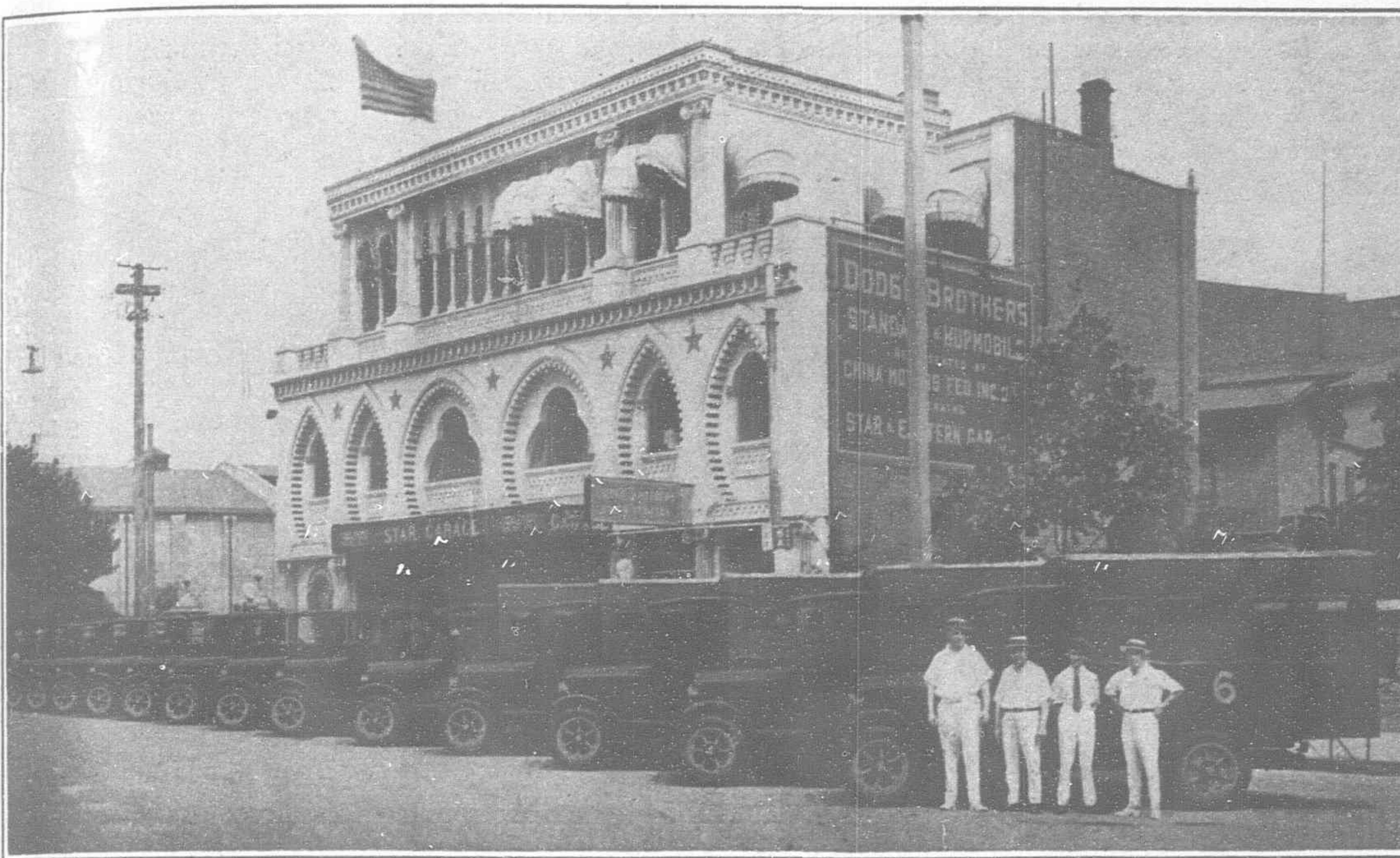
The history of China has been particularly marked by provision



A Transcontinental Bus in America



One of the Newest Type of Bus here, the Body made in Shanghai.



The Fleet of Trucks Sold to the Nationalist Government by the China Motors, Inc.

travel and the facilities for barter and trade, one of the most important questions in the building of a unified commonwealth. It is freely admitted, based on the experience of other countries, that any legislation affecting the availability of the motor vehicle to the masses is immediately followed by a restriction in plans for inter-city transport.

In consideration of the comparatively low rate of individual wealth in China, the adding of one fifth of the first cost of motor transportation would of necessity undo much of the work which has been done in the solving of the problem of internal transport. If the cost of motor transport is made as low as possible the result will be the promotion and increase of all imports and exports, by reason of the fact that such goods will have transportation facilities not now available constituting an additional economic advantage to China. Duty on the increased exports and imports thus encouraged, together with the large importation of motor vehicles under the ordinary tariff, would far exceed the nett revenue on the restricted volume of motor car imports paying the high duty. Based on the foregoing, I would say that it is obvious that any legislation adversely affecting the nation's transportation is inimical to China's welfare and to the foundations of national life.

I might make reference to the general employment of the motorcar in the relief of the areas of famine. The various humane organizations are particularly aware of the indispensable nature of the motor truck and passenger car in the carrying out of relief operation. The same may be said in reference to the districts frequently in danger by disease.

With the free and unrestricted use of motor vehicles to the interior of the province and the co-incident encouragement to road construction, much of the suffering which has prevailed could have been prevented by the distribution of China's national wealth and food resources more evenly over

the nation. Famines in China are essentially a lack of transport and not a lack of food. It is a well-known fact that grain and other food stuffs have been over-produced in certain areas and rotted on account of lack of transportation, while at the same time famines and death swept over areas not far away, and the famines could have been alleviated by transportation and the over-production of grains, distributed profitably. Over \$18,000,000 were subscribed and paid for famine relief work in China during 1920 and 1921 alone. This great expenditure of money could have been eliminated to a large extent by motor transportation had it been available for moving food stuff between the provinces.

The further development of China's railways must of necessity be retarded through financial considerations, and

the hope of the people for an early means of transportation must center on the motor car. During the past three years a large number of roads have been opened in various parts of China and without exception China's bus and transportation companies have begun operations, to the exclusion of the foreigner. These companies soon prove to the popular form of transportation amongst all classes, particularly, the lower classes and I believe that it is but a matter of time before China will really awaken to the great value of a general adoption of motor transportation and good roads for the general welfare.

What Motor Transportation has Accomplished in America

The automobile has been, perhaps, the greatest single new productive force in the economic and social development of the United States in the past twenty-five years. Practically unknown



One of the Largest Garages in the East—the Depot of the China General Omnibus Company in Shanghai.

when the twentieth century began, individual transportation has since added billions of dollars of wealth to the nation's resources.

In 1900 there were but a few hundred automobiles in the United States and their use was regarded as a luxury limited to the few. To-day there are 22,000,000 motor cars and trucks, more than one to every six persons, performing for the most part an essential transportation function.

Naturally enormous sums have been invested in the purchase and maintenance of these machines. For ten years the average sum spent in the acquisition of cars has been close to \$2,000,000,000 annually and the amount expended for gasoline, tires, repairs and garage items will now average almost three times that amount.

The Motor Not a Luxury

Obviously such an expenditure on a mere luxury would have had an adverse effect upon the other economic factors in production. But during the period of the motorcar's advance in America savings bank deposits have nearly doubled, individual bank deposits have more than doubled, assets of building and loan associations have tripled and life insurance in force has increased two and one-half times. The automobile as a basic element of transportation has contributed a vital part of the increased efficiency and productive capacity of all interests, which is reflected in higher wages and power of consumption throughout the population.

A recognition of this relationship by Government authorities and the general adoption of a fiscal policy which allowed development through the imposition of only very moderate taxes were among the factors which have from the outset permitted the expansion of motor car use in the United States. Had this policy not been followed, use would have been limited and the respective units of Government would not have been able to offset a proper share of highway expenditures through the large gross revenue now received from a very low average tax per car.

Savings in Time and Cost

The ways in which the automobile has increased the efficiency and productiveness of the individual, the business unit, the community and the nation are manifold.

Its first and most direct effect has been not only to reduce greatly the time in transit over the highways but also to cut in half the actual cost of highway transportation.

It is not necessary to dwell upon the saving in time further than to point out that the average daily haul of a horedrawn wagon was ten miles, which meant not only that the full day was spent on the road going that distance, but that the cost of labor so occupied quickly ran into such figures as to make the development of territory back from the railways out of the question for ordinary purposes.

From the standpoint of operating costs studies by the United States Department of Agriculture show that in 1918 wagon haulage cost an average of 30 cents per ton-mile for wheat, 33 cents for corn and 48 cents for cotton, while for hauling by motor the average costs were 15 cents for wheat and corn and 18 cents for cotton. Studies made since then show that still further economies are affected in the use of the motor vehicle on good roads as against bad roads, the saving in gasoline and tire charges alone frequently being more than sufficient to pay the entire cost of the road improvements. The general public realization of these facts has practically eliminated the horse as a factor in highway travel in the United States.

With improving methods of motor vehicle operation had maintenance, which have not yet been brought to the highest plane of efficiency, still further economies and benefits should be realized.

Of the changes effected in American economic and social life by the automobile, perhaps the most striking have come to the farmer. Government estimates place the number of automobiles on the 6,500,000 farms of the United States at 5,300,000 in 1924, with 460,000 motor trucks also in use. Agricultural students generally agree that the dominant reason for this broad use of the automobile by farmers was at the outset a social one.

Farm Life Revolutionized

The development of motor transportation has revolutionized the life of the farm. It has brought the town and country into

closer touch. It has in a considerable degree destroyed the historic isolation of the farm and the farmer. It has permitted a notable extension in educational facilities available for rural populations. The centrally located school reachable by motor transport from a large surrounding area has largely contributed to the solution of the problem of adequate equipment and adequate instruction for the rural children.

The automobile has proved an effective aid in the field of medical relief for scattered populations. It has enabled the farmer to receive prompt and better medical treatment and has made hospitalization available for large numbers of the population who hitherto had been without any possible recourse to such treatment. The development of community life and community spirit are some of the many significant social and cultural changes wrought by the development of motor transport in rural sections.

Aid to Business and to Government

Aside from the extensive use of the motor truck in hauling goods into the markets and of the passenger car for conveying individuals between their suburban homes and their places of business or employment in the city, both truck and car have become indispensable in the conduct of business and professional work within the city. The motor truck has replaced the horse-drawn truck and much of the heavy trucking between factories, warehouses and railway and water terminals, deliveries by express companies and by large stores are now made by fleets of motor trucks, and even the small merchant who formerly made his deliveries with his two or three horse-drawn wagons in replacing them with small motor trucks.

Bankers, salesmen, contractors, school superintendents and other public officials whose works carry them repeatedly from one part of the city to another use the motor car for this purpose. It is estimated that 144,000 physicians in the United States visit their patients by motor.

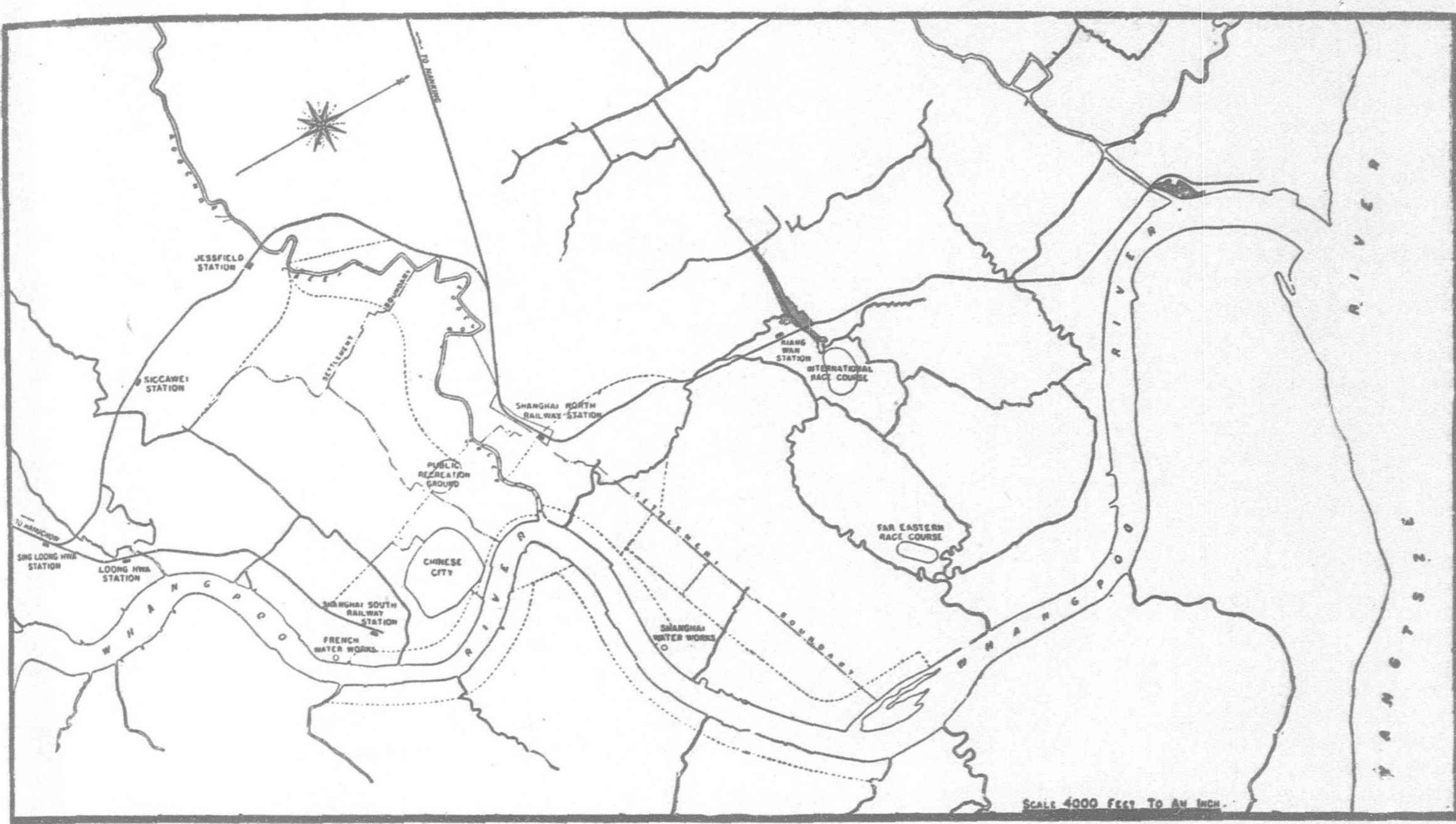
The motor vehicle has been a material aid to local government. Motorized fire, police and hospital equipment has both reduced the cost of administering these services and increased their effectiveness by vital saving in time. The utility and in fact the necessity of motor vehicles as a means of national defence was demonstrated in the last war.

And Mr. Moody follows up this line of reasoning with a sapient reference to the Great Wall of China, representative of millions of wasted lives. "If China," he says, "had built roads instead of ramparts, how different its history would have been."

Highway financing has become as much of a science in America as the construction of roads. It has become so simplified, too, that it would be an easy matter for the Chinese to adopt any one of a number of methods in the raising of money for road construction, when the demand becomes sufficiently great. Dr. Hu Shih, to whom reference has been made before in these columns, has said the improvement of transportation in China, where it now requires 104 days to make a journey across the country, is the first step in its economic salvation, and consequently in its whole material and spiritual reconstruction.

Mitsui and Osaka

THE great success which has attended the issuing in Tokyo itself of the 6 per cent. Loan for the City of Osaka is a feather in the cap of the Tokyo market generally and of the Mitsui Bank, which undertook the issue, in particular. The loan is the equivalent in yen of £7,000,000, and, is the biggest ever attempted in Japan independently of foreign support. It was originally intended to borrow in New York, but the heavy accumulations of idle funds in the first-class Japanese banks following the recent financial panic induced the experiment of trying the local market. The great success of the operation has more than justified it. The figures evidently has exceeded the most sanguine anticipations. The lists, opened to the public on September 15, and closed on the following day at noon, revealed a total subscription of over 252 million yen!



Shanghai

Is Shanghai Outgrowing Itself?

By H. F. Wilkins

CHERE comes a time in the life of every city when the need arises for a check-up on its growth. That time has arrived for Shanghai, according to city planning experts, who claim the city is in immediate danger of becoming overcrowded. The abnormal addition to the population of the city in the last few years, coupled with revolutionary changes in the type of street traffic, the present tendency of office buildings to rise high above streets that are not wide enough for them, and the traditional Chinese custom of packing houses and stores together like sardines in a can, gives rise to a serious problem that in other parts of the world has come a menace to comfort and safety.

Charles Harpur, Commissioner of Public Works, said in the last annual report of the Shanghai Municipal Council, "It is of the greatest importance to the town as a whole that a comprehensive scheme of city planning be devised for the whole outlying area within a radius of ten miles."

In addition to this need for a far-looking scheme of city planning in general, two specific needs are outstanding if the city of Shanghai is to escape a situation which is puzzling some of the wisest heads in the large cities of America and Europe. One is a need for revision of the building code to regulate the height of new construction and the amount of space provided around new buildings, and the other a necessity for

a comprehensive set of zoning laws, provisions that will segregate industrial units, shipping and commercial centers and residential sections. All of these problems and needs have a direct bearing on conditions of street traffic—parking of automobiles, street congestion, healthful working conditions and the aesthetic value of the city's physical appearance in future years. This aesthetic value has a tangible and monetary significance in spite of the usual connotation of the word. A beautiful city attracts people and brings in money. An ugly city repels both. Shanghai is a beautiful city now, and it can be made even more beautiful with the passing years.

Shanghai's Population

Shanghai has a real problem on its hands, and its ramifications afford an interesting study. As a metropolitan, or more broadly speaking a cosmopolitan area, it has much in common with such cities as New York, London, Paris, Los Angeles; particularly with New York because it occupies a similar relative position on the continent and because its expansion is similarly hampered. Manhattan Island is surrounded by water. Shanghai's International Settlement is surrounded by Chinese territory.

From another point of view, Shanghai's position is unique. Its population is composed of widely



Contrasts in Buildings—Nanking Road

different nationalities, each practically independent of the other, each with its own ideas of architecture and city planning, all of them influenced to some extent by the surroundings, which are Chinese. In spite of the thoroughly modern and foreign appearance of Shanghai as noticed by visitors to the city, and by those residents who go from their homes to their offices and their clubs with never a glance outside the Settlement, there are vast areas even in the Settlement with nothing in them but two-story or at the most, three-story Chinese houses and shops. From a point just west of the Commercial district out to the Race Course, and between Nanking Road and Avenue Edward VII, is a big district which in its most important aspect is just as much Chinese as the Chinese City itself.

A standard Chinese house of 12-foot frontage can be built twelve to the *mow*—72 to the acre—and this under present conditions of housing gives a

density of population of 600 per acre. This is remarkably high for any conditions of building for habitable purposes, and disastrous if continuous over a wide area. One of the most densely populated areas of the world is the Eleventh Ward of New York City, where the population is estimated at 696 to the acre; and it is important to note that while the density of New York is owing to its towering buildings, at least 95 per cent. of the buildings in the crowded Northern District of the Settlement, and in the district mentioned above, are two-story structures.

There are two reasons for the abnormal density of Shanghai. One of them is the natural and age-old tendency of the Chinese people toward gregariousness and concentration, and the other



New York's Skyline

(it must be remembered that the greater part of the population even in the International Settlement itself is Chinese) is the growth of Shanghai in the last twenty-seven years. The report of the Traffic Commission to the Shanghai Municipal Council in 1925 gives this in some detail, entered as it was at that time by the Commissioner of Public Works.

A census of the Settlement is normally taken every five years. The first census of the Settlement after the last extension of the boundaries was taken in 1900, when a population of 352,050 foreigners and Chinese was recorded. At the last census, 1920, the population had jumped to 783,146, an increase in the 20-year period of 122 per cent.

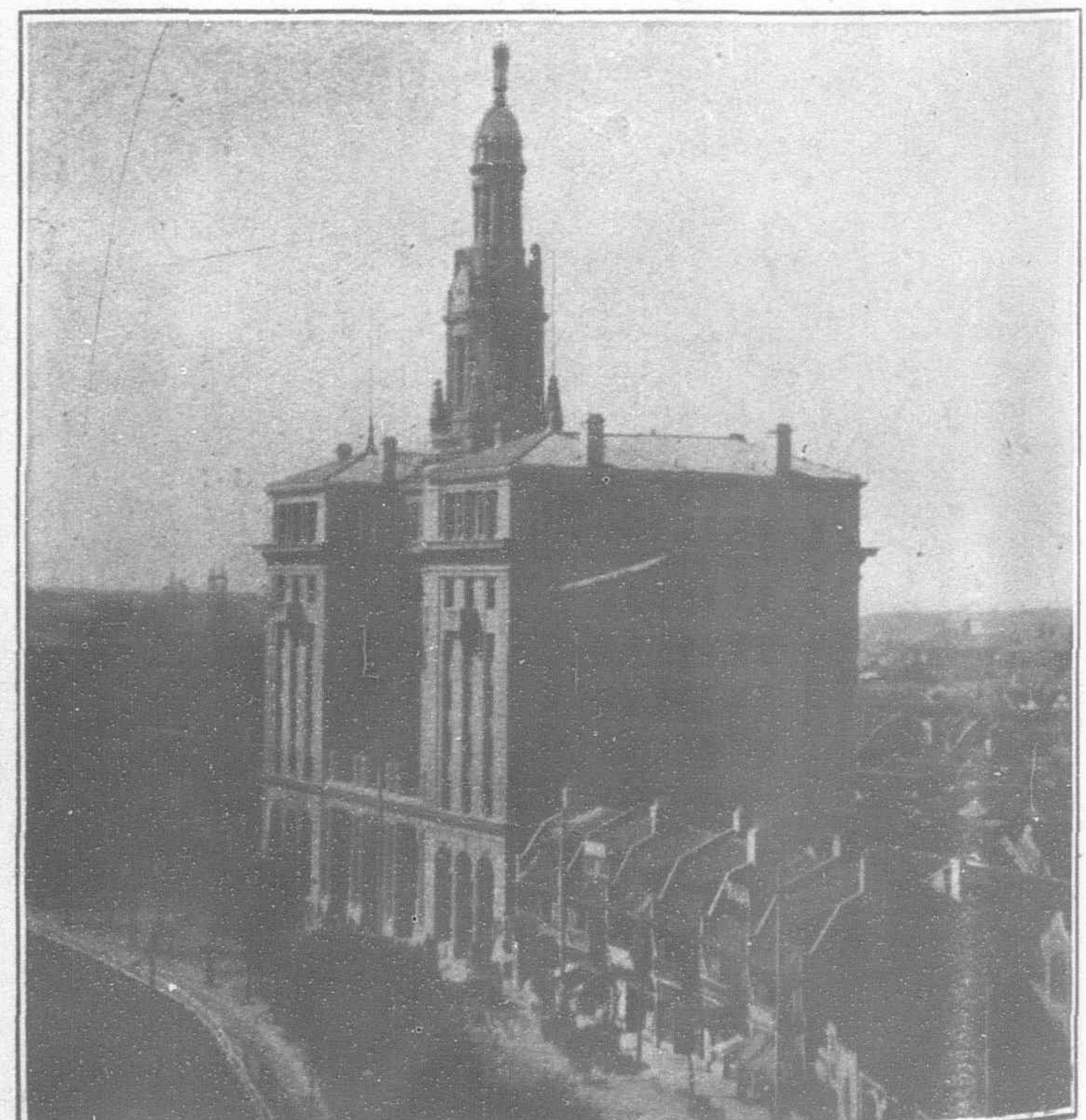
A comparative table of population from 1880 onward:

1880	..	..	110,009
1885	..	..	129,338
1890	..	..	171,950
1895	..	..	245,679
1900	..	..	352,050
1905	..	..	464,213
1910	..	..	501,541
1915	..	..	638,920
1920	..	..	783,146

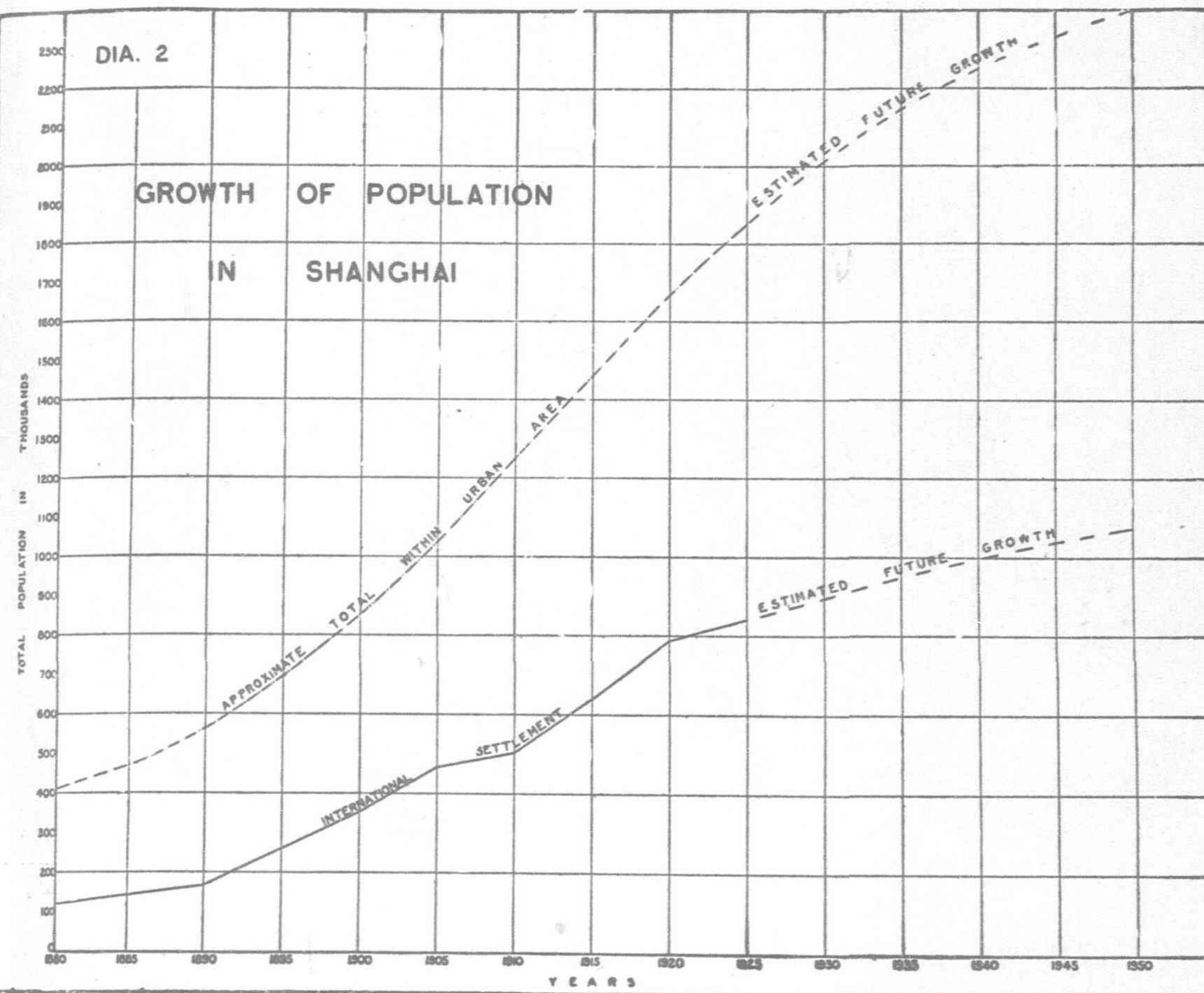
These figures are for the International Settlement alone, not for the Port of Shanghai. There is an unquestionable analogy, however, between the population of the port as a whole and of the Settlement. The Settlement figures are significant, and no great error of judgment results from using them as a criterion. The population of the Settlement in 1925 was estimated at 910,000, and it is now probably very close to 1,000,000.



Typical Two-story Shanghai Buildings



Building for the Future



Compared with Foreign Cities

A comparison of these figures with those for large cities of America and Europe shows that Shanghai's rapid growth can fairly be described as abnormal. In this table, such cities as New York and Los Angeles are omitted as being abnormal :

	1910	1920
Cincinnati	363,591	401,247
Buffalo	423,715	506,775
New Orleans	339,075	387,219
Louisville	223,928	234,891
Providence	224,326	237,595
Rochester	218,149	295,750
Breslau	510,929	528,260
Cologne	513,491	633,904
Hanover	302,384	310,431
Nuremberg	332,539	352,675
Chemnitz	286,455	303,775
Shanghai	501,541	783,146

Of course there are factors affecting the accuracy of any prediction of future population from a study of past counts. A growing city may at any time start to decay, owing perhaps to war, civil commotion, bad administration, loss of physical resources or causes affecting commerce and industry. But a plotted curve based on census is the most accurate means of telling how big a city will be in a given period.

Such a curve predicts for the International Settlement a population of 1,760,000 by the year 1950, and if such a population is reached in the Settlement alone, it might be the center of

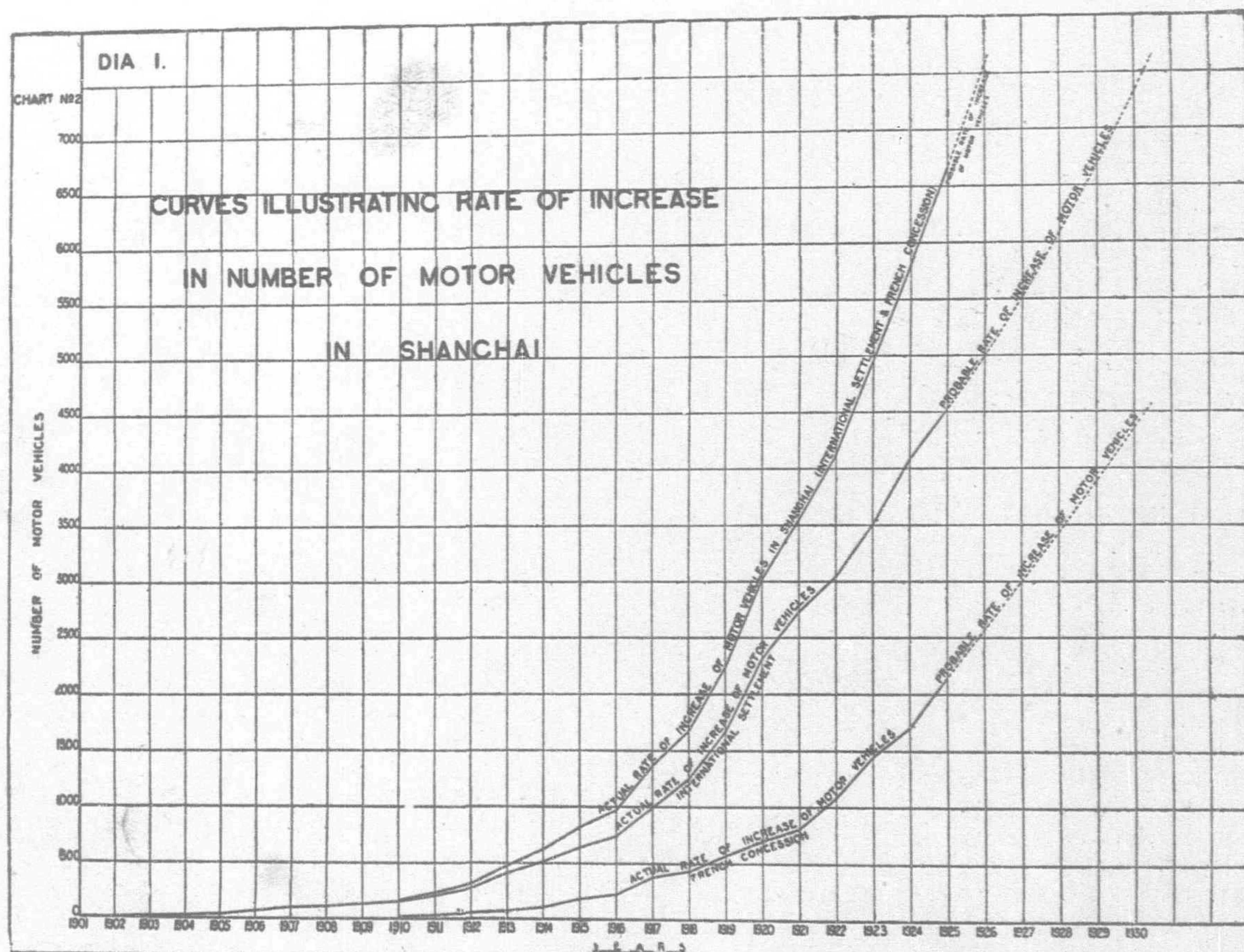
a population of some 3,000,000 or 3,500,000 in that time. A greater Shanghai population of 2,000,000 is predicted for 1930.

Population and Area

Now consider these population figures in relation to the area of Shanghai. The International Settlement contains within its boundaries 5,584 acres. The French Concession has 2,525 acres, and the built-up portions of surrounding territory, some 2,800 more—about 11,000 acres altogether. According to this, Shanghai as a whole will have by the year 1930 a little more than 181 persons to the acre. This, of course, is not dangerous if it were maintained at that figure equally over the whole area. But a city never is crowded in its outskirts. The real problem of overcrowding is confined to the central, congested portion. New York city suburbanites have plenty of room when they get home at night. It is when they pass to and from work that they have too little room to move easily. So, when figures are applied to the city of Shanghai to prove its true density of

population, they must be applied to the International Settlement.

The present density of population in the Settlement is 150 to the acre, but deducting open spaces and roads and vacant lots, the net density is well over 400 to the acre. And what is happening to the city is that those open spaces are being deducted too rapidly for comfort!



The Settlement is divided into four districts, the boundaries having never been changed since 1900. Relative density in the five districts is shown in the last five census counts, in population per acre :

	1900	1905	1910	1915	1920
Western District	29	51	55	77
Central	269	277	287	321
Northern	191	278	288	335
Eastern	27	35	42	61
					86

Note that in the Central District, where all the big buildings are, there were 338 persons to the acre seven years ago—already too high—while in the Northern District, where the really crowded

conditions exist among the Chinese, the figure was 574 ; and in this Northern District, where the buildings are rarely higher than two stories, conditions were almost as bad seven years ago as in the Eleventh Ward of the City of New York.

Skyscrapers and the Building Problem

Mere density of population in relation to area is not the only scene in a picture of an overgrown Shanghai. It brings with it the natural corollary of crowded buildings. A property owner is hardly to be blamed for wanting to get the greatest value out of his piece of ground, and this is responsible for the tendency to build skyscrapers in the congested districts and to build sardine-fashion in the tenement regions. Relatively speaking, with regard to other cities, that is, there are no real skyscrapers in Shanghai, no fifty-and sixty-story buildings

rearing to heaven; not even a fifteen-or twenty-story building. There is a very good physical reason for this. Underneath the city is an alluvial deposit of silt and mud, centuries of accumulation brought down by the Yangtze. In some places this mud is 900 feet deep. A building set on this soil, particularly along The Bund, must be set on a raft to keep it from settling. The new Customs building on The Bund, Shanghai's heaviest structure, is built on such a raft—a series of piles 50 feet long, driven into the soil and locked together at the top with an immense slab of solid concrete. Shanghai engineers say that the soil will stand nothing higher than fifteen stories.

So Shanghai escapes the menace of what had been called the

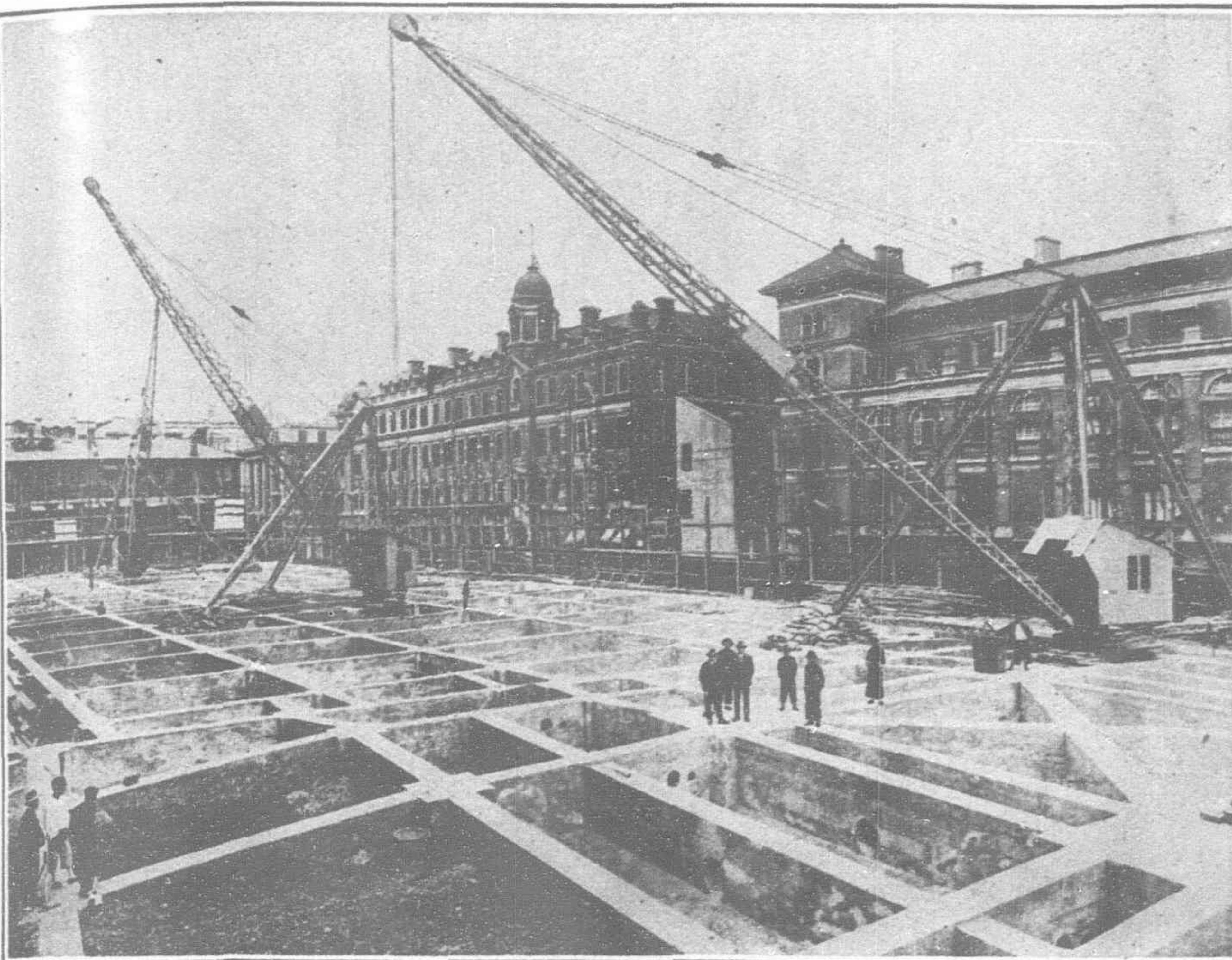
greatest mistake of modern architecture, the skyscraper. She faces in the future no such makeshifts as triple-deck streets with ramps, arcades, elevated railways, subways, leap-frog aerial bridges and the like. But she must expand some way. If she cannot grow tall, she must grow fat. Since expansion of the boundaries is hampered by the presence of Chinese territory, the only thing property owners can do is to put buildings close together—put the sardine principle of construction into play in the commercial and business center of the International Settlement. This would be disastrous, and this is the tendency the city must regulate.

Problems of Other Cities

Skyscrapers or no skyscrapers, Shanghai nevertheless can take a lesson from other cities whose experts are wrestling now with the concentration problem brought about by the unrestricted growth of tall buildings.



The Customs House Shanghai's Heaviest Building



Building a City on a Raft

In many urban centers, particularly in the United States, they are dealing with aggravated cases, and since necessity is the mother of invention, all sorts of crazy schemes, largely given play in the pseudo-science magazines, are being devised to alleviate the press of traffic. These are coming to be recognized nevertheless as the clumsy parents of plans that must be put into practise some day if movement of traffic is to remain within the realm of possibility. The City Club of New York has entered a protest with the mayor on the congestion problem, and the mayor has appointed a committee of 500 to get to the bottom of the problem, with special attention to skyscrapers.

Boston, Philadelphia, Washington, Chicago, Detroit, Grand Rapids, Los Angeles and Dallas all have their fears, and have taken steps to assuage them. In Grand Rapids, a new building restriction law has recently been overstepped by construction of a 34-story building. Chicago has raised its lid to 265 feet. Washington, Boston and Los Angeles still abide by their self-imposed restrictions. Los Angeles is a prime example of a city grown fat. With a law prohibiting any building from rearing more than twelve stories above the pavement, she now claims the greatest area of any city in the world, and the transportation companies and automobile dealers have consequently reaped their profit.

Boston has recently built two 15-story hotels, and this is her limit. San Francisco, menaced by the same danger of earthquakes that holds Los Angeles to her 12-story law, has just finished three buildings in the financial district, all of them as tall or taller than the Telephone Building, which was conceded for some time after its construction as the limit of height. One of the new structures is 32 stories high. It seems that when the spirit of rivalry gets to working among cities they can't stop putting up skyscrapers. Detroit believed she had something on New York

when she announced the unbelievable 85-story Book Building. Now New York comes back with plans for a 110-story building on Forty-second street that makes the Book Building look like a bungalow. As New York builds up, she also must burrow. Plans are on foot now for a triple-deck subway. So it goes.

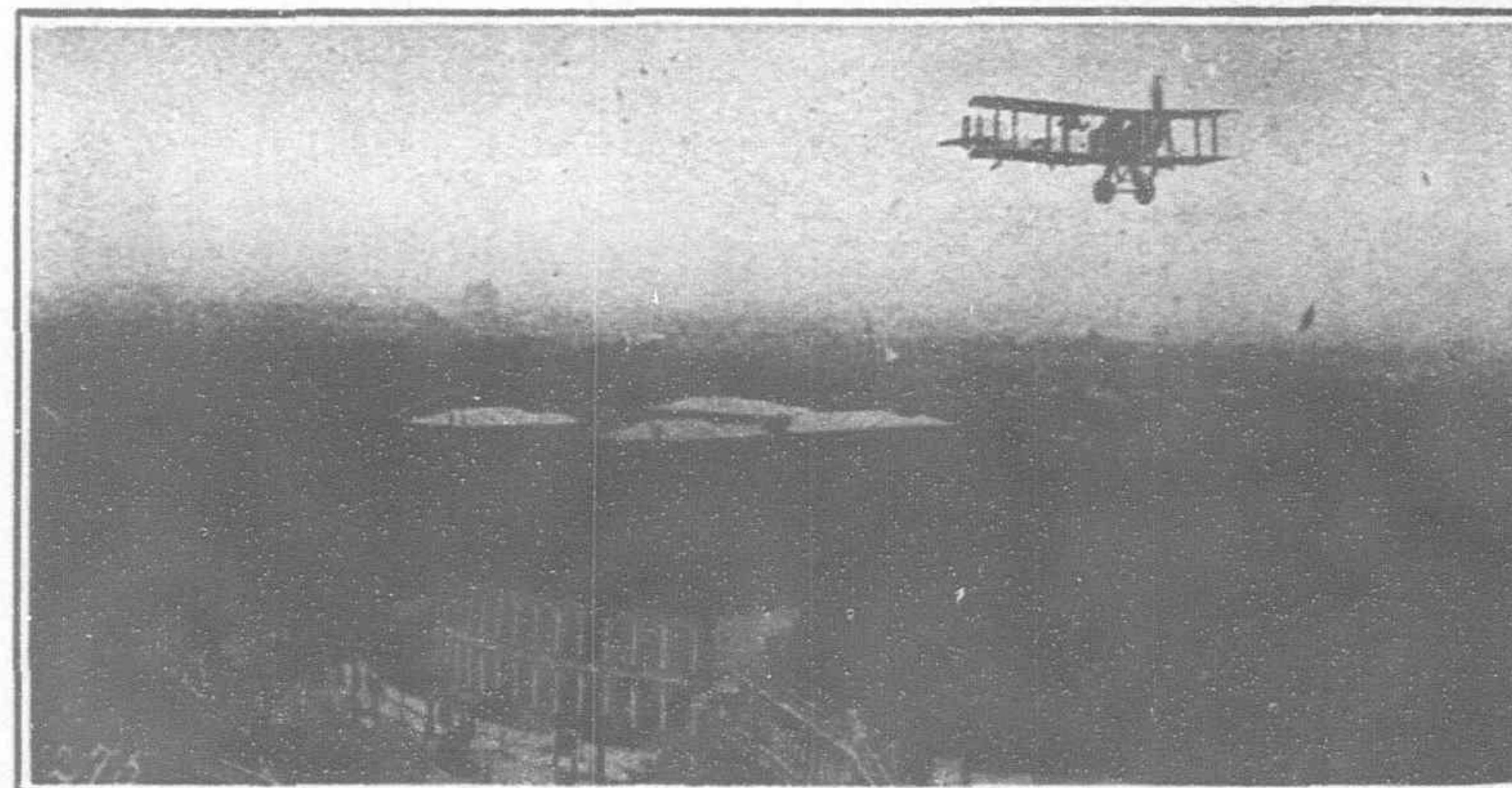
Old world cities are more conservative, but they also have their problems. Europe for the most part refuses to lift the lid. Paris has gone to the extreme in being conservative, ordering two stories lopped off a hotel which had mounted above the allowed level of buildings. Melbourne and Sydney, in Australia, have forbidden skyscrapers. Canadian cities refuse to go to extremes. It has remained practically the sole province of American cities to build into the skies for utility purposes, and now those American cities which have done so are forced to devise expensive means to pay the price of building folly. New York will always remain the prize example of this folly. It is said that she has 100,000 buildings, and that 2,000 of these are skyscrapers. The trouble with skyscrapers of course lies in their tendency toward too great concentration of the population. This, for another reason than skyscrapers, is Shanghai's danger, one which can be avoided by remembering that an ounce of prevention is

worth a pound of cure, and that the maximum height of buildings should in general keep to within one and one-half times the width of the streets on which they face.

Shanghai Street Traffic

One important criterion of overcrowding in a city is the condition of traffic on its important streets. While it is not outstandingly apparent to the casual observer that Shanghai is overcrowded when buildings alone are considered, it is undeniable that the streets of the city are sadly jammed with an unbelievable variety of traffic. It has been said that no city of the world has a greater variety of vehicles on its streets than has Shanghai. They range from the most primitive forms of transportation, centuries old, to

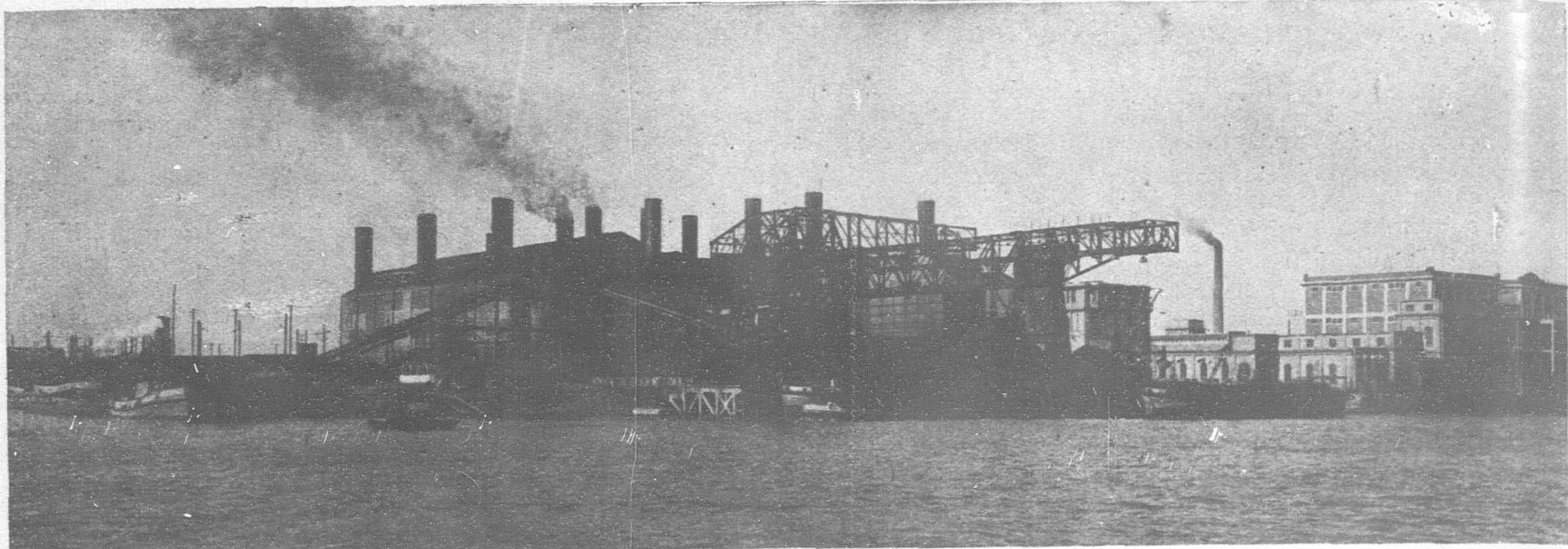
the most modern, high-powered and luxurious means that an advanced civilization can produce, with the addition of at least one



Overcrowded Shanghai from the Air



A Thoroughfare Known the World Over—The Bund



The Power Station in the Eastern Industrial Zone

modern passenger traffic development peculiar to Shanghai, the so-called railless tram. Consider the different kinds of wheeled vehicles seen every day on the streets—rickshas, wheelbarrows, lumbering hand carts, occasional sedan chairs, the horse and carriage used by brokers, motorcycles, motor cars, bicycles, and the afore-mentioned railless trams, in addition to the network of streetcars, with and without trailers. A more motley array of wheeled traps can hardly be imagined, yet they are all crowded together on the same narrow streets of the International Settlement with practically equal privileges in right of way.

Newly adopted methods of traffic control in the Settlement have gone a long way toward making the best of a bad situation, and it is a fact that Shanghai has a very low rate of traffic mortality. This is largely owing to the fact that it is possible, at no great expense, to keep a traffic policeman, either a Sikh or a Chinese, on every intersection, at a very great saving of life and damage to property. But Shanghai traffic is very slow. The installation of electrically controlled traffic signals on all the important streets, and the direction of traffic for three or four blocks at a time on Nanking Road and a few other main arteries has helped a good deal to speed things up, just as it has in other cities where the plan has been tried. Shanghai traffic is not as bad as it might be, but the narrow streets, the lack of

sidewalks or footpaths, the slowness of antiquated hand carts and wheelbarrows and rickshas, and the large proportion of pedestrian traffic that "jaywalks" in the road-ways, makes it bad enough.

Traffic Commission's Report

On August 18, 1926, the Traffic Commission, appointed by the Municipal Council and headed by J. S. S. Cooper, submitted to the Council a long and detailed report with numerous recommendations, the result of eighteen months of careful and painstaking investigation into conditions as they exist in the city with regard to traffic.

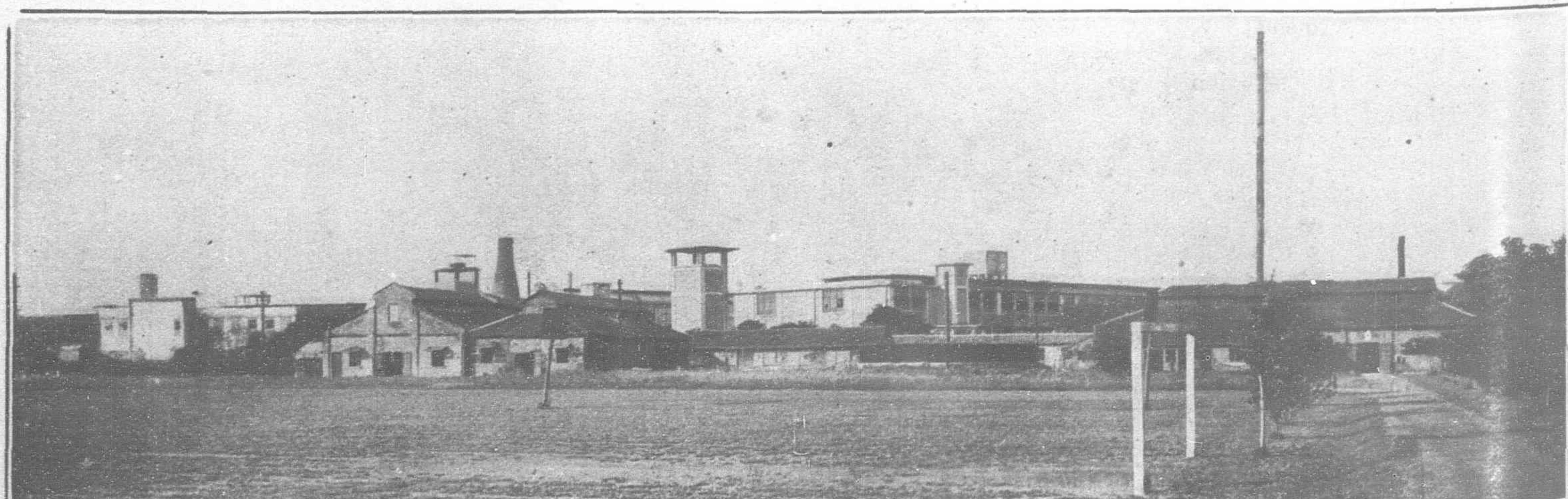
This document is one of the most significant and valuable records possessed by any city, dealing with measures necessary for future traffic requirements and considering the probable development of Shanghai during the next 30 years. The investigation covered such topics as density of population, pedestrian traffic, freight transport by road and creek, "rush hour" traffic, the road system and traffic control; and it made

recommendations as to changes in the building rules, zoning by-laws, road improvements and traffic control in its general aspects.

The need for such a thorough report cannot be denied, but it is brought out into the spotlight by a statement Mr. Harpur of the Public Works Department made in his annual report.



What Chance Has Traffic Here?



The Bulb Factory in the Western Industrial Zone

He said: "As an illustration of the need of early planning, it may be noted that road plans for the western District, still the basis for development in that section, were devised 27 years ago."

Said the Commission with reference to the growth of traffic in Shanghai: "When Shanghai was established as a treaty port, its present development could hardly have been foreseen. Population and trade have grown rapidly and continuously, and at the same time industry has centered in the district to no inconsiderable extent. This has of course been accompanied by corresponding increases of traffic, and means taken in the past to cope with this have perpetually been overtaken by further growths. Motor traffic appeared in Shanghai in the early years of the century, and its constantly increasing expansion is shown in the accompanying curve of vehicles licensed (diagram reproduced with this article). Tramways were opened to traffic in 1908, and motor omnibuses appeared on the streets in 1924. The advent of mechanical transportation changed and intensified the problem of traffic in all cities, not so much because of the added traffic as by reason of its entirely different character.

Man-hauled Vehicles

"The problem has proved serious enough in Europe and America, but in Oriental cities the extraordinary variety of traffic units induces special complications. Man-hauled vehicles are so slow in speed and so utterly different in character from mechanical traffic units that the existence of the two types side by side in the same streets presents a very serious problem of accommodation and control.

"Until relatively few years ago the foreign population of Shanghai looked upon itself as transitory, and there was a consequent lack of foresight and of provision for the future. The actual growth of traffic and the advent of mechanical transport could not, perhaps, have been fully foreseen, but even so, the streets and the police system of to-day reflect the absence of vision in those who in times past controlled the destinies of the International Settlement of Shanghai."

In addition to detailed discussion of the traffic features already mentioned, the Commission went into a study of traffic counts and classification of wheeled vehicles according to number, preparing the following table:

CLASSIFICATION OF WHEELED VEHICLES.

The numbers in brackets are the numbers licensed on June 30, 1926.

	Man-hauled or propelled	Horse drawn	Mechanically operated
PRIVATE	Bicycles (10,346) Ricshas (11,000) Pedicabs (8)	Carriages (282)	Motor cycles (464) Motor cars (3,748)
TRADE	Tricycles } (522) Hand trolleys } Handcarts } Warehouse trucks } (1,526)	Horse Carts } (24) Horse Vans }	Motor cars (45) Motor vans } (439) Motor trucks }
PUBLIC	Ricshas (10,000) Wheelbarrows (11,220) Handcarts (1,795)	Carriage (286)	Motor cars (308) Motor vans } (305) Motor trucks } Motor omnibuses (50) Rail trams (90) (plus 90 trailers) Railless trams (58)

They heartily recommend the licensing of every type of vehicle, not only ricshas and motor cars but hand carts as well. They found that a considerable portion of traffic congestion is owing directly to the obstruction of the way by "carry coolies," who transport heavy burdens on bamboo poles. This can hardly be remedied by licensing, but it is hoped the problem will gradually take care of itself by the increased use of mechanical transportation and by the shifting of as much as possible of the heavy-burden carrying over into the night hours.

The Passing of the Ricsha

Although ricshas have increased tremendously in number in the last few years, it is the opinion of many persons who have studied the problem that the ricsha is doomed to pass within a few years—go the way the horse has gone. This is the opinion of Mr. Harpur of the Public Works Department, who believes that the motor car, the omnibus, the trams and general public opinion will drive them out. He calls attention to the fact that two cities in

India have already banned the ricsha, and believes that Shanghai will be first of all foreign cities in China to get rid of them.

The Traffic Commission makes its findings and recommendations regarding the ricsha with the hope that this vehicle will cease gradually to ply the streets of Shanghai, and finds that the increase of private ricshas in the last few years in the greatest menace in the whole problem of ricshas.

"The private ricsha presents two special difficulties," says the Commission in its report. "The pullers are usually old and experienced runners with good traffic sense. This is more than often employed in impudent violations of traffic laws, hardly ever in consideration for other traffic. Adequate control should be the remedy. The other problem is that of parking. It is hoped that with the growth of public transport, these private ricshas will be largely replaced.

"Public ricsha licenses are held at a definite maximum in number. Relatively few of the coolies are permanent, and many are raw countrymen with no knowledge whatever of regulations, and no traffic sense. Their presence in traffic is a danger to themselves and their fares, and a menace to all other street users. No evidence can be found that ricsha coolies are ever trained for their work, although sound advice is given by the Ricsha Mission. As long as the present system of recruiting these coolies exists, so long will the country folk look to ricsha pulling as a pleasant and easy means of filling idle days and weeks, and so long will the turnover of ricsha coolies be excessive and their training impossible."

The following table was prepared by the Commission to show the increase in the number of licensed ricshas between 1916 and 1925:

RICSHAS LICENSED.

Year	Public	Private
1916	7,487	5,368
1918	8,000	6,209
1920	8,000	7,373
1921	8,000	8,126
1922	8,000	7,728
1923	8,000	7,465
1924	11,485	9,537
1925	10,000	10,126

Buildings, Traffic and Zoning

It cannot be denied, then, that a serious traffic problem does exist in Shanghai. The Traffic Commission spent 18 months in proving it, and still the community hardly realizes it, ready as always to stick to the *laissez faire* policy. In dealing with traffic the Commission also proved that a serious need exists for the regulation of building height and density, for thorough revision of the whole building code, for re-planning and re-laying some of the streets, and for making an intelligent city plan for the future. All these needs are part and parcel of the one big problem of city congestion.

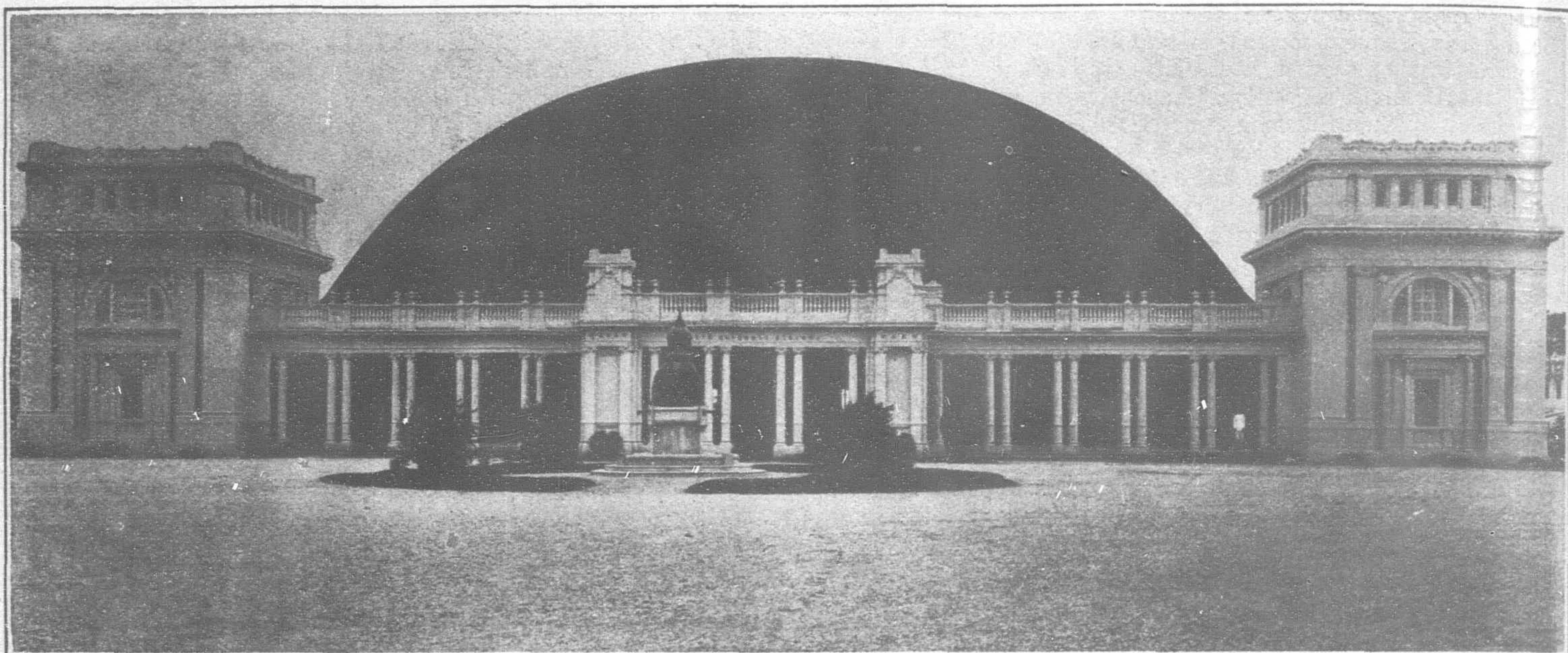
The first and foremost recommendation of the Commission with regard to the traffic problem itself was that the Council should set up a permanent traffic committee not confined to members of the Council. They further urged that a movement be instituted to educate pedestrians to walk upon the footways, and keep to the left, and that on busy thoroughfares crossing by pedestrians should be restricted to definitely arranged places. The use of bicycles to carry more than one person was found to be a bad practice that ought to be checked, and it was definitely recommended that passenger and freight man-hauled vehicles be eliminated within a definite period, say ten years.

The whole of the traffic regulations as they now exist should be revised and strengthened, and the Traffic Commission should be empowered to establish a traffic court for the summary disposal of all offences except those of the most serious nature, as the Consular and Provisional Courts have an adverse effect on the control of traffic.

Special Area Development

So much for traffic itself. The complete solution of Shanghai's problem of overcrowding involves more than that. A set of zoning laws is of the utmost importance. Zoning is a practice which has occupied the thoughts of American real estate men and city planners increasingly in the last few years. The National Association of Real

(Continued on page 454)



Bangkok Station, Northern Line—The Bangkok Terminus

Royal State Railways

Abstract of Administrative Report for the year B. E. 2468.—(April 1925—March 1926)

Railway Development during the Reign of King Rama VI.

By H. R. H. the Commissioner-General of Railways

AS a tribute to the memory of His Majesty King Rama VI (Vajiravudh), whose demise occurred within the year under report, I wish to place upon record a few facts and figures relating to railway development within the 15 years of His Reign.

The most important act to be recorded to the credit of His late Majesty is undoubtedly legislation relating to Ways of Communication. By the promulgation of the Law on Organization of Railways and Highways in the year B. E. 2464 the status and work of the State Railways Administration was firmly established. The method of expropriation of land, regulations governing the transport of passengers and merchandise, and measures to be taken to assure public safety were the salient points of that Law.

Another event of far-reaching importance was the formation of a ten year program of railway development, consisting of extensions to the Eastern and North-Eastern Lines and unification of gauge in order to link up the whole of the State Railway System. This program, which may rightly be called the King Rama VI's program, was commenced in B. E. 2462 and should be terminated by the year B. E. 2473.

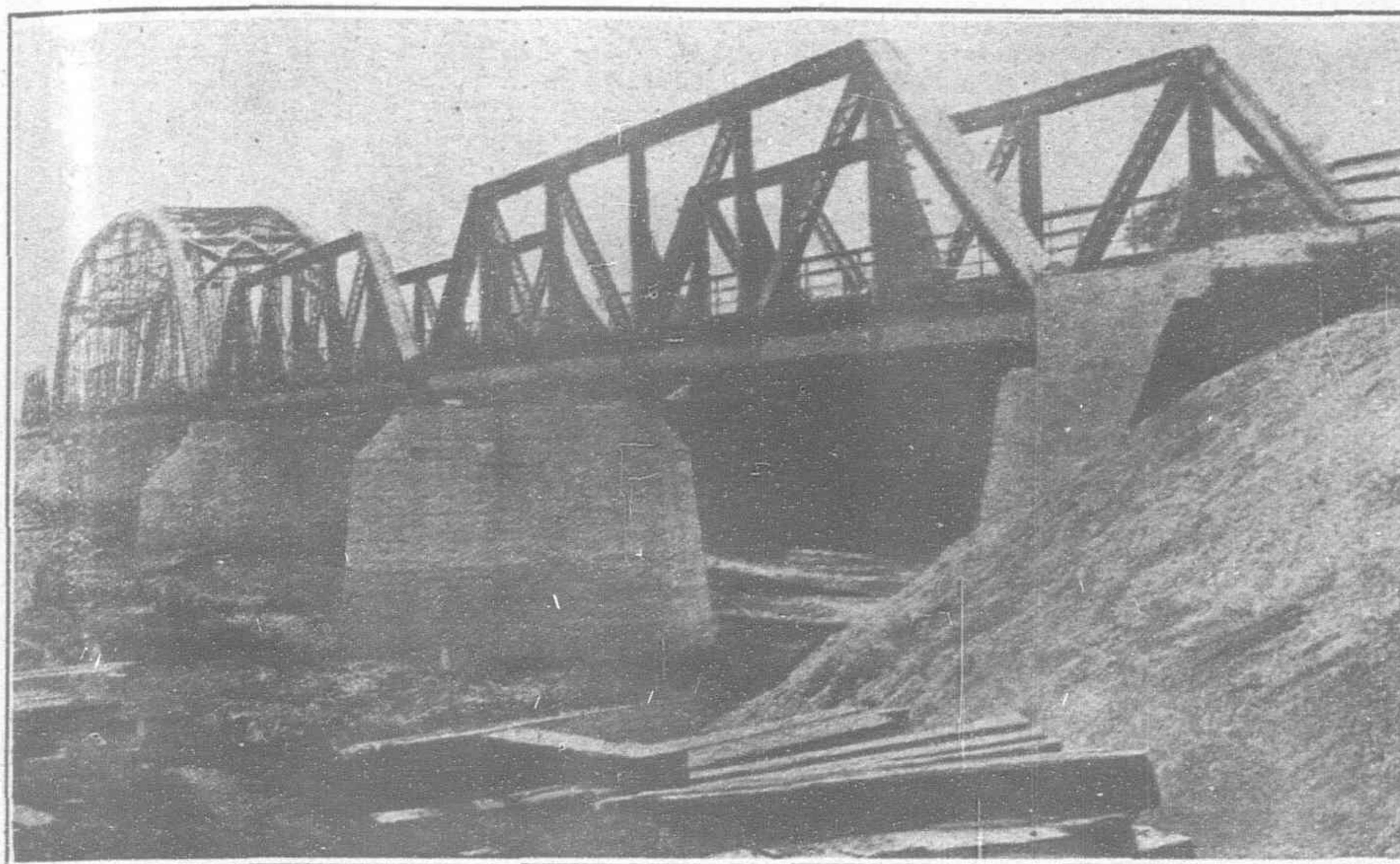
As regards the record of progress of Railway development, at the end of



H. M. Rama VI, Late King of Siam

King Chulalongkorn's reign the total length of State Railway Lines opened to traffic amounted to 932 Kms., while 690 Kms. were under construction. At the end of King Rama VI's reign the length of opened lines had reached a total of 2,581 Kms., representing an increase of 1,649 Kms., or 177 per cent., while 497 Kms. were being constructed.

In order to complete the additional 1,649 Kms. of construction, it was necessary to add to the original capital of Tcs. 59,000,000 a sum of Tcs. 101,000,000, giving a total amount expended on Railways by the end of His Majesty's reign of Tcs. 160,000,000. The capital outlay was therefore increased by 171 per cent. Gross receipts from the State Railways at the beginning of the last Reign amounted to only Tcs. 4,500,000, while at the end the figure was over Tcs. 16,000,000, representing an increase of 256 per cent. Nett receipts during the corresponding period had increased by more than Tcs. 7,000,000, or by 258 per cent. The total receipts during the 15 years' reign of His Majesty King Rama VI amounted to more than 135 million ticals, and the nett amount paid into the Royal Treasury was over Tcs. 74,700,000. The policy of development of the country by means of Railways has not only opened up the country, bringing into easy reach localities hitherto backward in development and enlarging the country's volume of trade



Bridge over the Mool River at Tachang North-Eastern Line

thereby, but has also proved to be an excellent investment for the Government.

It may be said that the year B. E. 2468 has been a highly successful one both from the point of view of financial results and from the point of view of construction progress. It is most gratifying to the Railway Administration to see development on all sides wherever the railway line touches. Lands hitherto undeveloped owing to inaccessibility are now being put under cultivation; land values are increasing everywhere. For the excellent results obtained, as reviewed in this Report, I wish to take this opportunity of recording my very high appreciation of the energy, resourcefulness and the untiring devotion to Government Service displayed by Railway officials and staff of all ranks.

Full confidence may be placed in the present Sovereign to continue the good work initiated by His Majesty King Chulalongkorn and vigorously pursued by His immediate Royal Predecessor King Rama VI (Vajiravudh).

Railway Hotels

His late Majesty recognised the fact that, in order to bring Siam's products to the notice of foreign traders, as well as to develop tourist traffic within the kingdom, it was necessary to have up-to-date modern hotels. In my last report it was stated that His late Majesty's interest in the development of Railway Hotels had already been demonstrated by the Royal visit paid to Hua Hin Hotel. Towards the end of the reign His Majesty conferred a great benefit upon the country by deciding to place the Royal Palace at Phya Thai at the disposal of the State Railway Administration in order to convert it into a hotel. This Royal wish was confirmed by the present Sovereign, who came to open the hotel at Phya Thai Palace in person on the 18th February, B.E. 2468. This Royal Palace is very suitable in every way for use as a hotel and has a large amount of accommodation for all classes of travellers. Further, in order to meet the needs of tourists passing quickly through the country and of commercial travellers, His late Majesty decided that a Railway Rest-house should be built at the Hua Lampong Railway Terminus which is close to the business quarters. The construction of this rest-house was commenced only after the Royal demise. A glance at the Indo-Chinese peninsula will demonstrate the fact that, as far as land routes are concerned, Bangkok is undoubtedly an important center of communication; hence the Royal policy in the development of Railway Hotels for the convenience of passengers has been an exceedingly wise one and will surely be abundantly justified in later years.

For the present the earnings from hotels are being booked under miscellaneous receipts, but in later years, as further developments take place, it

is proposed to publish separate accounts of the hotels as a subsidiary organization of the State Railways.

Electric Power Station

For some years past the Government Electric Power Station had been placed under the Ministry of Local Government and, when that Ministry was amalgamated with the Ministry of Interior, it formed a portion of the Department of Municipal Affairs. His Majesty the King, recognizing that the Power Station is in fact a Government Commercial undertaking and that the suburban railway traffic is growing so fast that it may in the near future be necessary and economical to electrify the portion of the Railway System near Bangkok, decided to put the Government Power Station under the Administration of the State Railways. The Government Power Station was accordingly taken on February 13th 2468. In order to arrange for the administration of this important addition to the work of the Department, it was decided to create an Electric, Tele-

graph, and Signal Service under a Head of Service to be called the Chief Electrical Engineer of the State Railways, having under him the Power Station, the Railway telegraphs, telephones and signals. The capital outlay on the Electric Power Station is not to be amalgamated with Railway capital; consequently, so far as the Government Power Station is concerned, it is to be treated as a separate and subsidiary organization, and the annual report of its working and finance will be issued separately and not embodied in the Railway report.

Construction Progress

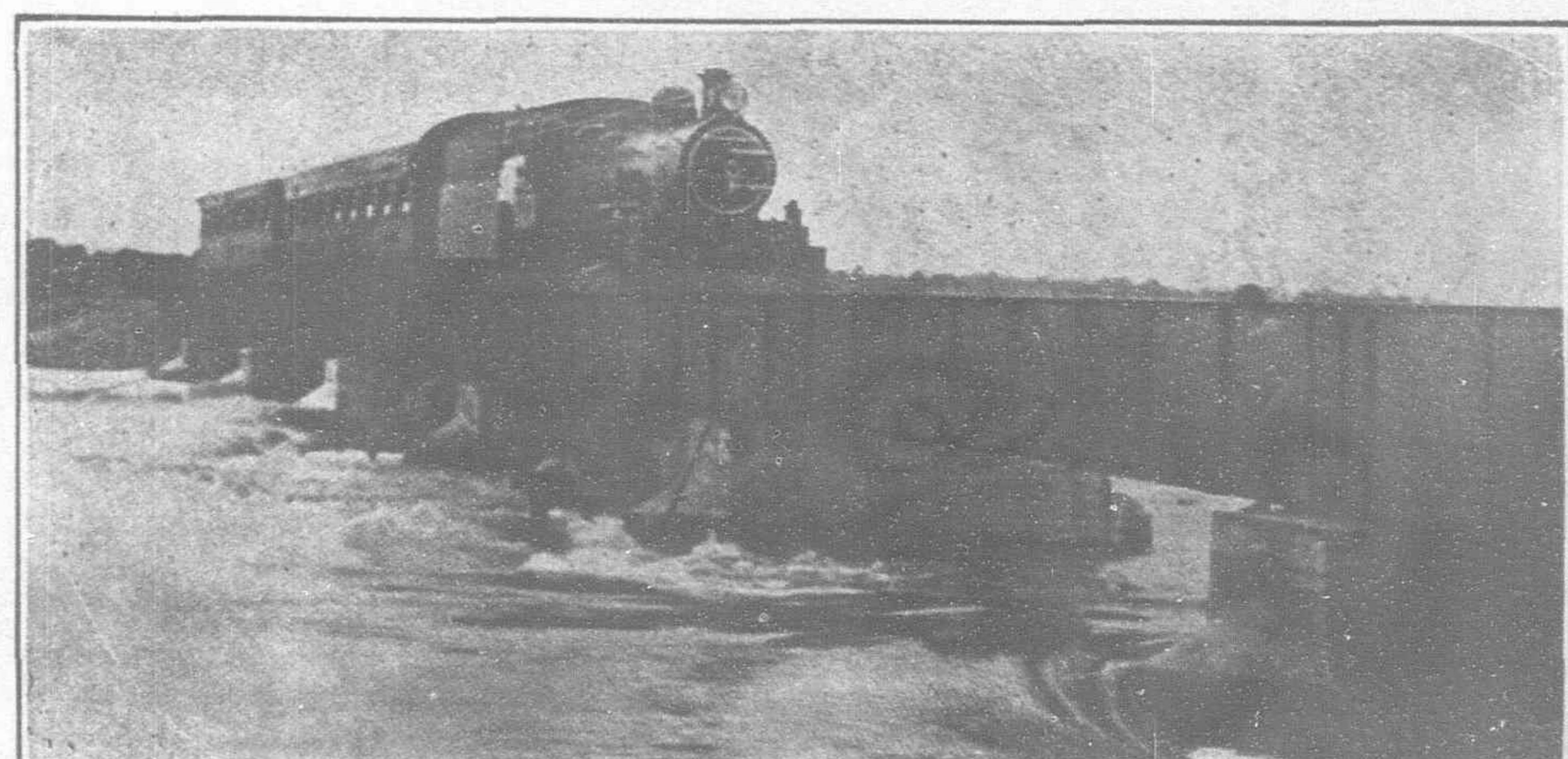
On the Eastern Line railhead reached the terminal point at Aranya Pradesa on 17th February, and will be ready for opening at the beginning of B.E. 2469.*

On the Ubol Rajdhani Line railhead at the end of the year reached Km. point 462,800. Only 42.05 Kms. of plate-laying was done during the year. This was attributable to several causes, namely, to delays in the removal of rails from certain portions of the line and in the work of conversion of gauge owing to pressure of traffic, and also to the bridges not being completed up to time, although the embankment was completed right up to the terminal point at Varindr, Km. 575.600.

On the Khonkaen Line a further section of 50 Kms. was put under contract, that is to say, from Km. 312 to Km. 362, while the first section was being made ready and materials assembled for plate-laying early in 2469.

On the Rama VI Line plate-laying was completed except for a few hundred meters near the West abutment, and the contractor was doing his utmost to expedite the work.

*This line is now open to the frontier.



Royal State Railway at K. M. 84—Southern Line

Conversion of Gauge

On the Northern Line plate-laying had reached Km. 633. Conversion was also effected in certain portions, *viz.*, up to Km. 633.10 in January, and from Km. 641 to Km. 654.800 and from Km. 728.400 to Km. 752.200 in the year. Station yards were completed only as far as Utaradit, and the removal of broad gauge track from the North-Eastern Line was completed as far as Km. 126 in February.

Safety Appliances

A number of measures to increase public safety were introduced during the year, such as, for instance, vacuum brake or through pipes which have now been standardized on goods wagons. Also a device to interlock the point with the signal has been adopted and gradually installed at stations where traffic is somewhat heavy, in order to prevent the possibility of accidents resulting through careless handling of point switches by the station staff.

Opening of Further Portion of North-Eastern Line

On April 1st a further section of the North-Eastern Extension to Ubol Rajdhani was opened to traffic up to Buriram, Km. 377. Traffic on this extension is growing yearly in importance, as may be seen from the other portions of this report.

Change of Headquarters of Maintenance District

Owing to Hua Hin being more centrally situated for inspection purposes and to the fact that there is a great deal of work involving capital outlay on Hua Hin development work, it was decided to transfer the Headquarters from Petchaburi section to Hua Hin. This took effect on March 4th, 2468.

Work of the Legal Branch

The good work of the Legal Branch continues. Its investigations have been the means of consolidating the position of the Administration as regards Railway land, and it has also assisted in getting the rents paid where in former times people were prone to be dilatory. The Legal Controllers have also had to help in expropriation cases. Out of 336 cases handed in 317 were dealt with, leaving 19 to be attended to at the close of the year.

Personnel of the State Railways

The total of the Staff and Labor of all classes in the Department at the close of the year was 13,991, as compared with 14,652 of the previous year, distributed as follows:—

Siamese 10,736; Europeans 34; Chinese 3,038; Indians 131; and Others 52.

Summary of Comparative Statistics

The following is a summary of Comparative Statistics of the Royal State Railway System during the years B.E. 2467 and 2468.

	B. E. 2468	B. E. 2467
1 Length of Lines opened... ... Kms.	2,581	2,490
2 Length of Lines under construction ... „	497	588
3 Length of Lines under survey... ... „	—	—
4 Total length of Lines sanctioned ... „	3,078	3,078
5 Number of Locomotives	143	136
6 Number of Passenger Carriages and Tramcars	340	341
7 Number of Goods and other wagons ...	2,427	2,344
8 Total Capital Tcs. 160,020,222	Tcs. 148,611,295	
9 Average Capital cost per Km. of Open Line	61,999	59,683
10 Gross Earnings	16,117,203	13,879,003
11 Working Expenses	6,316,612	6,034,961
12 Nett Receipts	9,800,591	7,844,042
13 Percentage of Working Expenses to Gross Receipts	39.19%	43.48%
14 Percentage of Nett Receipts to Capital after deducting Renovation Fund	5.62%	4.78%
15 Total Train Kilometers Kms.	4,951,795	Kms. 4,314,129
16 Traffic Receipts per day Tcs.	44,157	Tcs. 38,025
17 Traffic Receipts per Km. of Open Line ... „	6,245	5,574
18 Traffic Receipts per train Km.... ... „	3.25	3.22
19 Running cost per train Km. ... „	1.28	1.40
20 Total number of Passengers	6,006,672	5,649,056

21 Total Goods carried	Tons 1,155,893	Tons 981,412
22 Head of Live-stock carried	Head 324,849	Head 217,355
23 Number of Passengers per train Km....	1.21	1.31
24 Average fare paid per Passenger ... Tcs.	1.18	Tcs 1.15
25 Average distance travelled per Passenger Kms.	47.13	Kms. 46.10

Is Shanghai Outgrowing Itself?

(Continued from page 451).

Estate Boards has drafted zoning laws that are designed to fit the general needs of any city, and most of America's cities have fallen into line by adopting modifications of these laws. The provision of permanent open spaces and the "earmarking" of land for civic purposes is one that should not be delayed in Shanghai, and this itself is closely associated with zoning. A map of the city accompanies this article showing roughly how Shanghai should be "zoned." This was prepared by the Commission.

The Commission in its report found that the building rules should be revised and strengthened with the object of controlling the density of houses designated as "Class C," which includes the ordinary two-story Chinese house, so likely to lead to overcrowded areas. Also the height of office and commercial buildings should be controlled by law, and builders should be forced to provide a certain amount of open space about these structures.

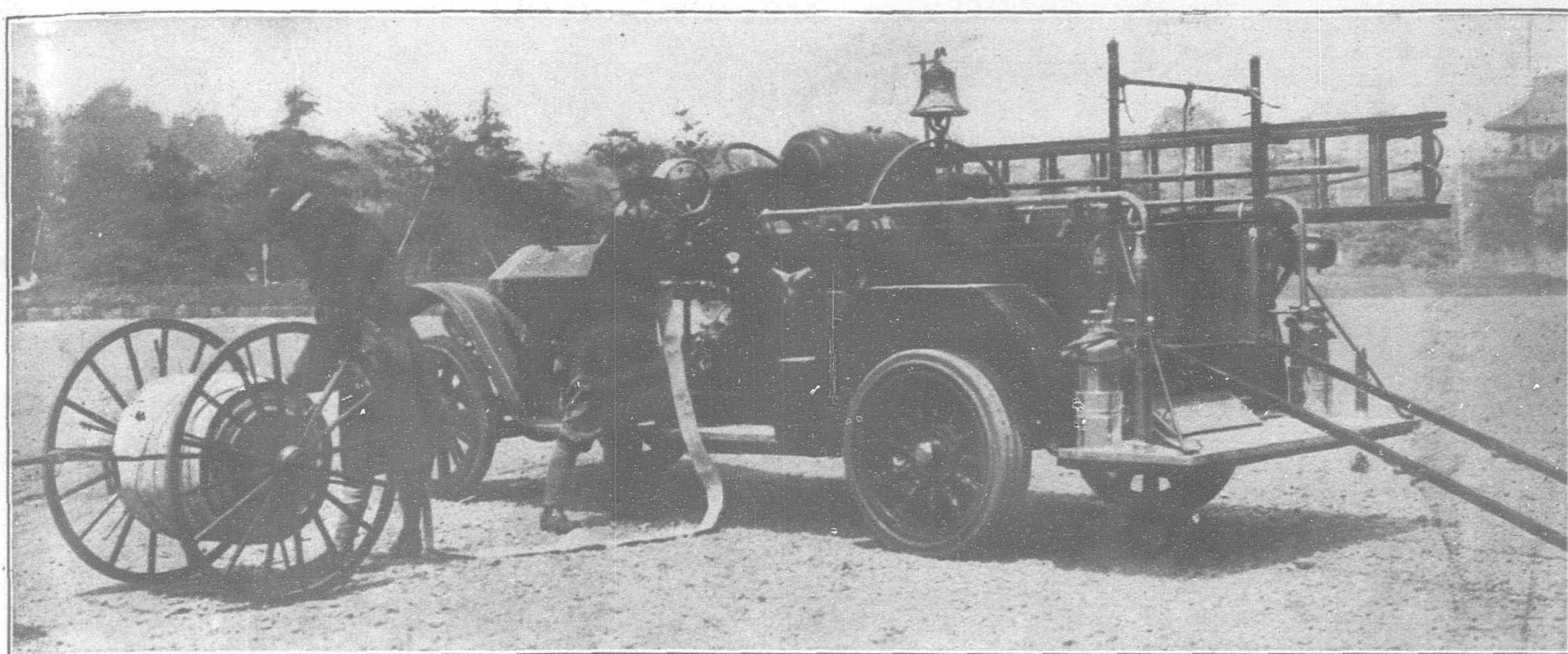
Two recommendations bearing particularly on this principle of zoning were set forth. One was that the erection of new godowns should be prohibited in the business district, aiming at the reduction of freight traffic in the area where business traffic is intense. The other was that two areas, one in the Eastern District and one in the Western District, should be reserved for residential purposes. In these areas, the erection of any further factories, industrial premises or "Class C" houses shall be prohibited.

Street Widening and Extension

A thorough and specific program for the widening and extension of twelve different important streets in Shanghai was presented by the Commission to the Council in 1925, long before the complete report was finished. These twelve included, in order of recommended priority of construction, Sinza Road, Soochow Road, Jinkee Road, Boone Road, Carter Road, West Soochow Road (through the Gas Works), Nanking Road, Taku Road, Boundary Road, Park Road, Point Road, and construction of a new road across the Race Course.

It is interesting to note that while the city of Boston has streets that are traditionally descendants of cow paths, Shanghai's original streets were laid out along the borders of meandering creeks, especially in the Central District and in Hongkew. A large temple, afterwards used as a Customs house, once stood on the present site of the Customs House, and at this time The Bund was little more than a tow-path for boats along the Whangpoo River. The earliest official plan of roads appears to have been prepared about 1854, when landowners were required to surrender their property where the community needed it for road building purposes. The earliest roads were those that now form a part of Peking, Nanking, Kiukiang and Soochow Roads, and they were originally two *chang* (22 to 23 feet) wide.

None of the changes and improvements effected in Shanghai's street system since these roads first were laid out, have been accomplished except in the face of strenuous objection by property owners who were directly or indirectly affected, and this brings up a point which is closely associated with the future development of Shanghai. No future comprehensive city plan for the regional development of Shanghai, no plan for the proper widening of roads, creation of zones, restriction of building by-law, no plan that looks to the beauty of the city that will be Shanghai thirty or fifty years from now, or that tends to control the density of population, can be put through without meeting strenuous objection from property owners, both Chinese and foreign. Reasons and proofs must be offered for actions that may be necessary in the working out of this plan, when it is completed. Proof of the need for such a plan has been offered here.



The American La France 75 H. P. Motor Fire Engine of the Fire Department, Tokyo

The Industrial Machinery Market of Japan

United States Retains Position as Principal Supplier to Japanese Market

Based on report from Trade Commissioner J. H. Ehlers, Tokyo

ADEFINITE halt in the progressive decline in Japan's industrial machinery imports, which had continued (with the exception of 1924—the year following the earthquake) ever since 1921, appears to have taken place in 1926. Imports of this class of machinery during the first 10 months of 1926 (the latest period for which Japanese statistics are available) totalled Y.58,420,000* (\$27,300,000) as compared with Y.58,380,000* (\$23,750,000) for the corresponding period of 1925. Thus, in terms of local currency this trade remained practically the same during these two periods, but in terms of United States currency, owing to the advance in the value of the yen, there was a gain of \$3,550,000.

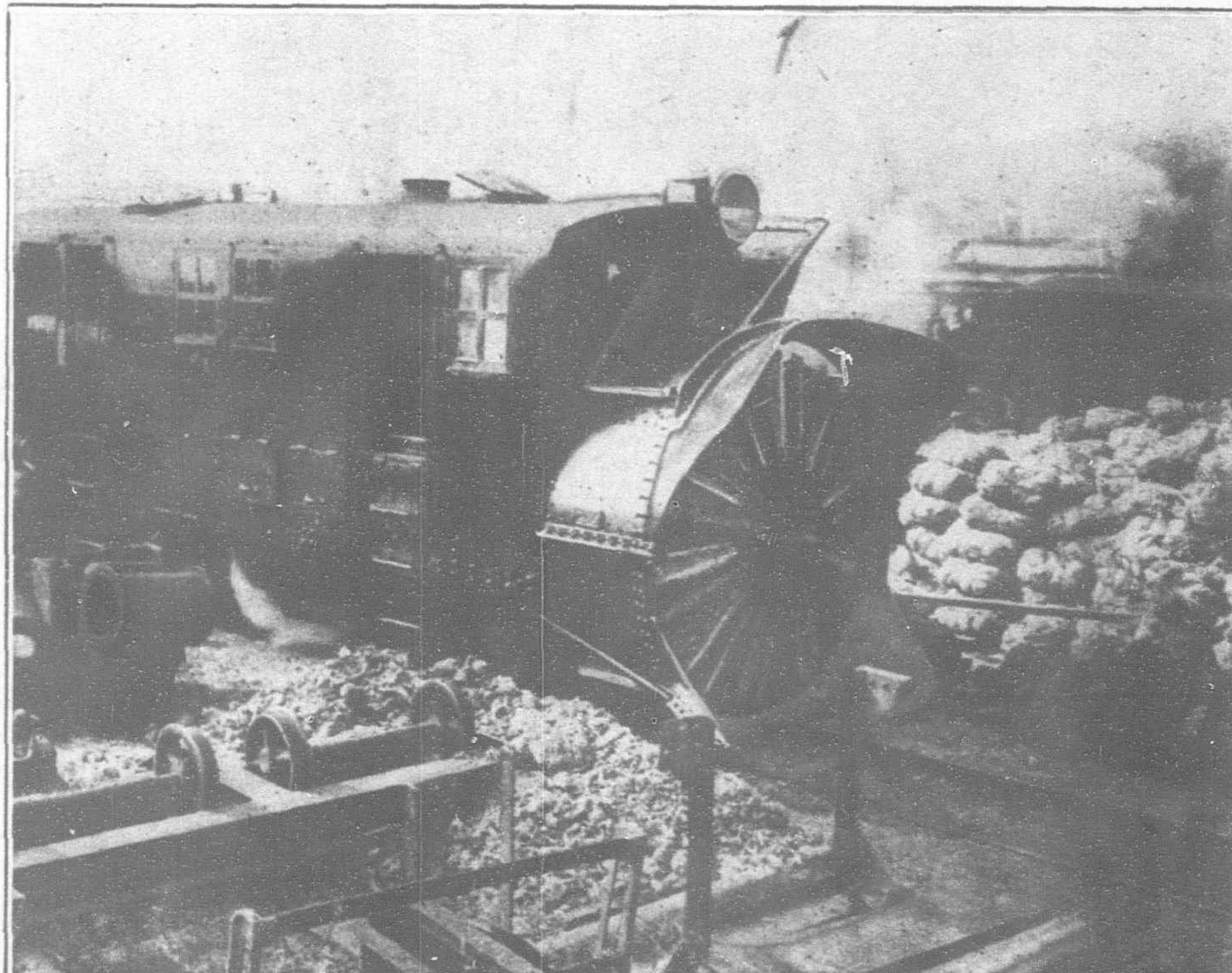
United States Shares Market Decline

Although the United States continues to be the most important supplier of industrial machinery to the Japanese market, it has shared in the general market decline. Imports of this class of machinery from the United States have shown a steady decrease since the record year 1919 when they reached the great total of \$25,022,000.†

Between 1921 and 1925, Japan ranged from the second best to the sixth best market for American industrial machinery, as compared with a position of eighth to tenth best in the years preceding the war. During the pre-war years 1910 and 1913, for example, machinery imports from the United States averaged only \$1,876,750 (according to American statistics). It is necessary to bear in mind these pre-war figures in order to properly appreciate the Japanese market and its possibilities.

Largest Share of Market Retained by United States

Although Japan has fallen from second to sixth place since 1922 as a market for American industrial machinery, the largest portion of the Japanese market for such equipment is still retained by the United States. This favorable position has, in fact, been held since 1918. Japan's imports of industrial machinery from the United States in recent years have been valued as follows: 1921, \$20,941,000; 1922, \$14,256,000; 1923,



Rotary Steam Snow Plough, manufactured by the American Locomotive Company for the use of the Imperial Japanese Railway in the Hokkaido. These ploughs were set up at the Takatori shops and trials made by ploughing piles of sawdust.

*Conversion rates for 10 months' periods: 1925, \$0.4068; 1926, \$0.4673.

†Based on United States statistics. Elsewhere, unless otherwise specified, the Japanese statistics are given.

\$11,832,000; 1924, \$10,626,000; and 1925, \$6,254,000. (United States statistics.)

The decrease in Japanese machinery imports from the high levels of the years prior to 1921 does not necessarily indicate that the Japanese market is a declining one; that it will fall back to its pre-war volume; or that Japan's industrialization has yet reached a stage where the imported products have no place. Japan's industrialization is dependent on its financial condition and economic position, and this is not at present favorable enough to stimulate continued rapid progress. Industrial development, as well as the import of machinery itself, is controlled by Japan's governmental policy more than it is in any other country, and can be further curbed or stimulated should the Government so desire.

Outlook for Machinery Market

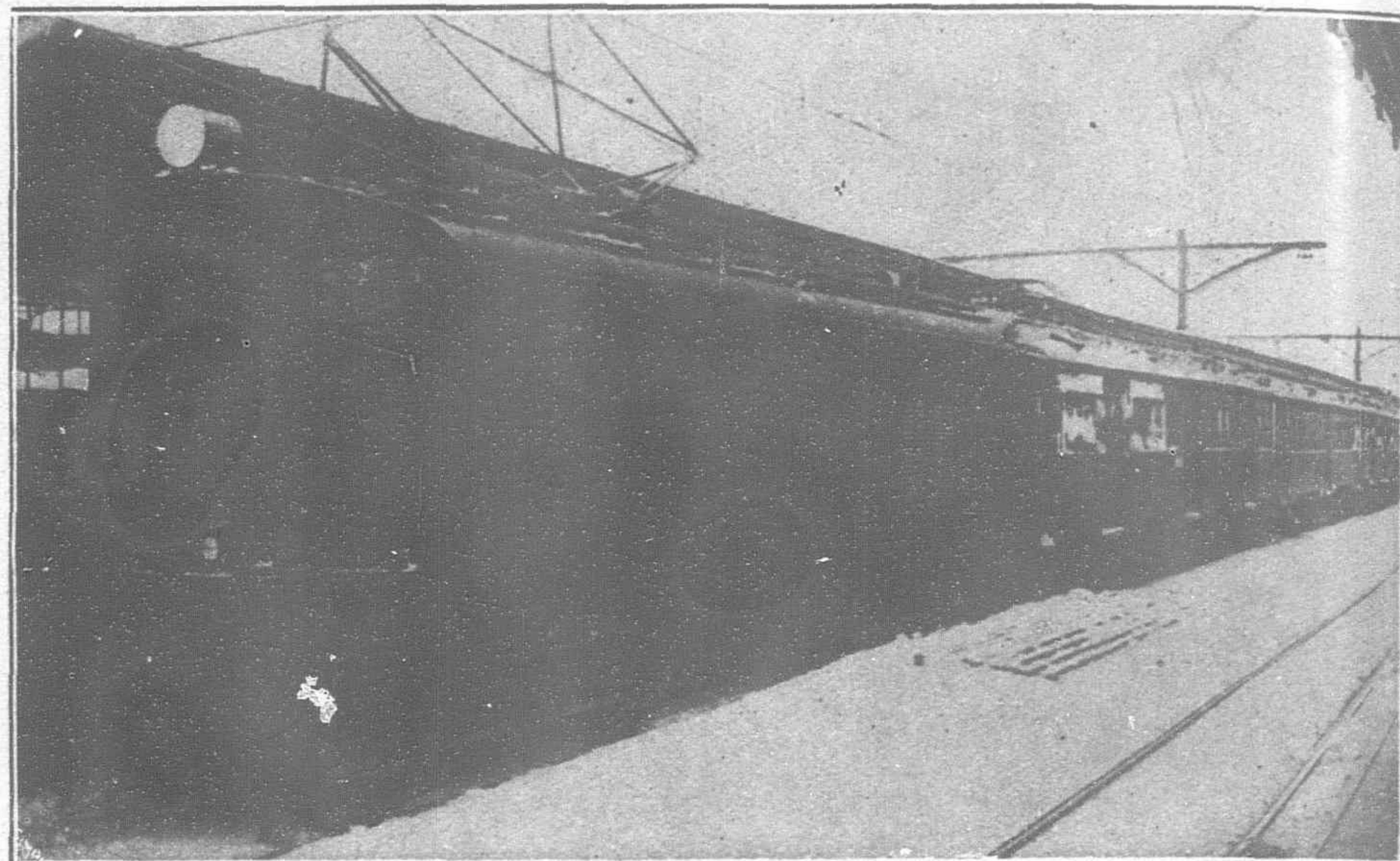
It seems reasonable to believe that the bottom has now been reached in the decline of machinery imports, and that the 1925-26 figures represent a reasonable annual figure for the next few years, barring unexpected developments in Japan's general financial position. However, the development of Japan's own machinery industry is such as to make the market more specialized and of continually changing character. The smaller and simpler types of machinery in all lines are being produced locally, and will continue to be produced in increasing amounts, thus causing a decreasing market in this respect. It is likely, however, that the manufacture of some of the larger types of machinery at present produced will prove to be unsatisfactory and uneconomical, and a better market will be afforded for foreign manufacturers in such lines.

The classes of industrial machinery entering Japan during the calendar years 1921 to 1925, inclusive, and also during the first 10 months of 1926 as compared with the corresponding period of 1925, are shown in the following table. The figures for the years 1922 and 1923 do not show complete returns for the port of Yokohama, as some records for these years were destroyed in the earthquake of September, 1923.

Imports of industrial machinery into Japan, 1921 to 1925, inclusive.

[Values in thousands of yen *]

Class of machinery	1921	1922	1923	1924	1925	First 10 months	
						of	1925
Steam boilers †	7,605	6,402	2,949	5,473	5,839	5,146	3,924
Fuel economizers	1,510	932	681	645	518	479	621
Steam turbines	2,292	1,052	499	2,298	1,452	1,434	2,493
Steam engines	391	121	141	32	60	57	27
Gas and petroleum engines ‡	1,111	2,371	2,732	5,572	5,732	4,315	3,819
Water turbines §	1,600	2,979	3,028	1,463	773	773	2,208
Cranes	1,034	771	2,056	827	589	545	776
Capstans ¶	671	635	379	1,044	660	559	529
Gas compressors	1,335	1,769	2,394	2,444	1,759	1,397	1,756
Pumps	1,991	1,391	1,252	1,949	1,569	1,319	1,390
Blowers	263	241	296	1,246	677	608	577
Hydraulic presses	198	143	535	186	56	52	68



Westinghouse Electric Locomotive Hauling Passenger Train on Japanese Imperial Government Railways

Pneumatic tools	501	336	267	657	407	338	613
Metal or wood working	10,977	6,521	3,808	7,747	5,745	5,198	2,475
Spinning	29,180	30,596	22,690	12,050	7,707	6,557	6,435
Looms	2,973	1,333	1,336	816	608	548	447
Tissue finishing	2,122	1,467	1,112	1,162	656	449	614
Knitting	328	216	227	266	466	431	185
Paper making	916	959	631	1,243	801	764	986
Other machines and parts	35,853	32,262	30,842	43,166	32,545	27,412	28,476
Total	102,851	92,497	77,855	90,286	68,619	58,381	58,419

Spinning Machinery is Principal Item of Import

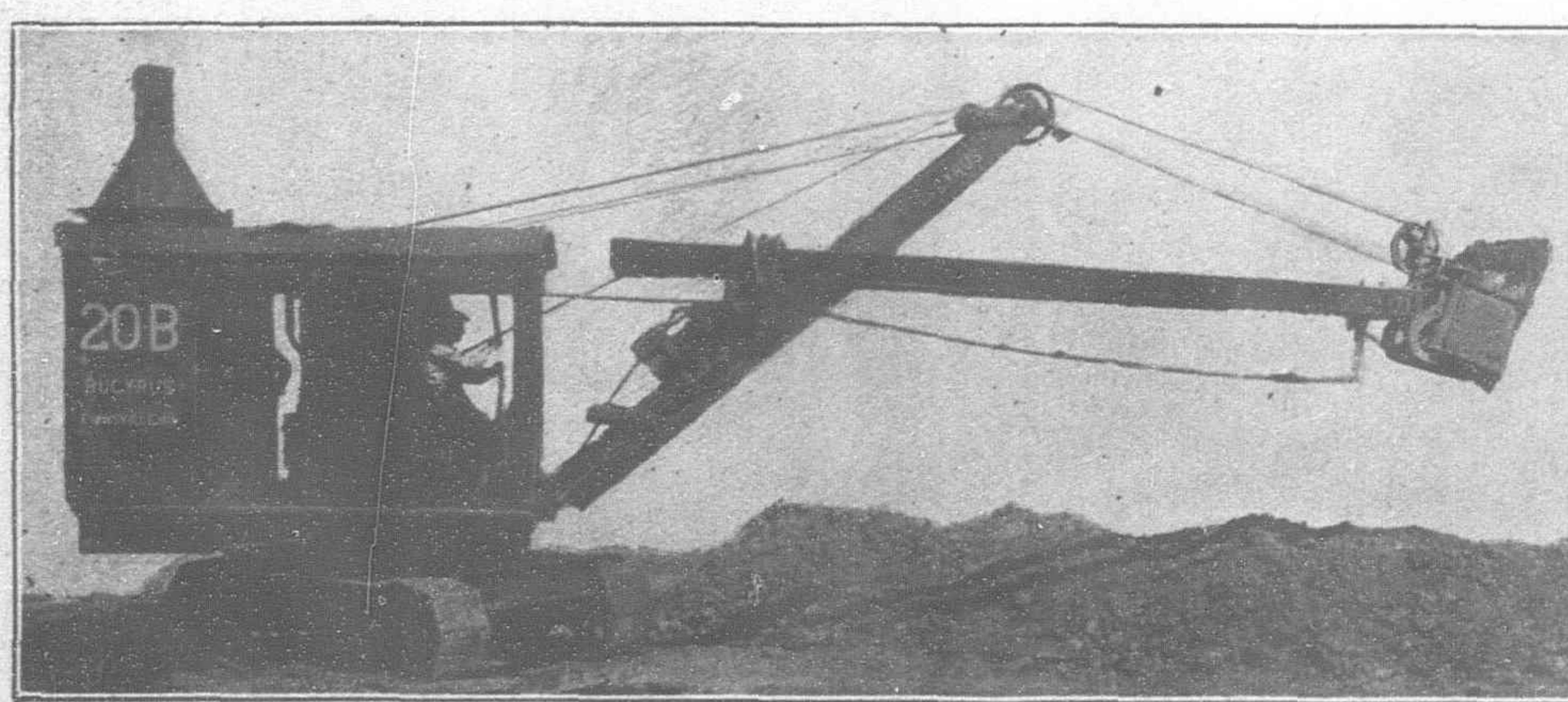
Spinning machinery is by far the largest industrial machinery item in the Japanese imports. Imports of textile machinery have been showing progressive declines for several years, accounted for largely by the increasing manufacture of this class of machinery in Japan. Other contributing causes are a slowing-up tendency in the expansion of the Japanese textile industry and a disposition on the part of Japanese capitalists to establish plants in China, where labor is cheaper and raw materials more accessible.

The other principal classes of industrial machinery entering the market during the 1926 period were: Steam boilers, gas and petroleum engines, steam turbines, metal and wood working machinery, and water turbines.

Certain Classes Show Gains in 1926

Although imports of steam boilers, gas and petroleum engines, and metal and wood working machinery decreased during 1926, imports of both steam and water turbines made remarkable gains. Other items showing important increases in 1926 were fuel economizers, cranes, gas compressors, pneumatic tools, tissue-finishing machines, and paper-making machinery. As a result of counter-balancing increases and decreases in individual classes, the total imports of industrial machinery for the first 10 months of 1926, as already indicated, remained practically the same as in 1925 in terms of yen.

However, owing to the exchange advance of the yen during this period, the value of these imports increased from approximately \$23,749,000 for the 1925 period to \$27,300,000 for the period of 1926.



Bucyrus 20-A Revolving Shovel, used in Japan

Competition for Japanese Trade

During 1925 the United States was predominant in supplying steam turbines, gas engines,

*Value of yen for calendar years: 1921, \$0.4825; 1923, \$0.4858; 1924, \$0.4110; 1925, \$0.4104. Value during 10-months periods: 1925, \$0.4068; 1926, \$0.4673.

†Includes parts and accessories.

‡Includes hot-air engines.

§Includes Pelton wheels.

¶Includes other winding machines.

gas compressors, pumps, hydraulic presses, pneumatic tools, metal and wood working machinery, and looms. Great Britain, on the other hand, led as a source for steam boilers, fuel economizers, blowers, spinning and knitting machinery. Germany secured the largest trade in water turbines, tissue-finishing and paper-making machinery. Its competition has been severe in wool-textile machinery, printing machinery, paper-making and box-making machinery, and in small machine tools. In general, German competition has been more noticeable in light machinery and small units than in larger equipment, and has been largely a matter of price, the quality being somewhat inferior to that of the corresponding American products. Matters of large credits and consignment shipments have not played an important part in the German competition. In several large installations, however, extended terms of payment have militated against American equipment in favor of European.

The consensus of opinion is that German competition is stronger in the Kobe district than in the Tokyo district, perhaps because the demand in the former is for small-shop equipment, while in the latter construction machinery of various sorts is a greater item and American makes predominate.

Detailed Trade of Leading Supplying Countries

The following table presents a detailed statement of imports of industrial machinery from the most important sources—the United States, Great Britain, and Germany:

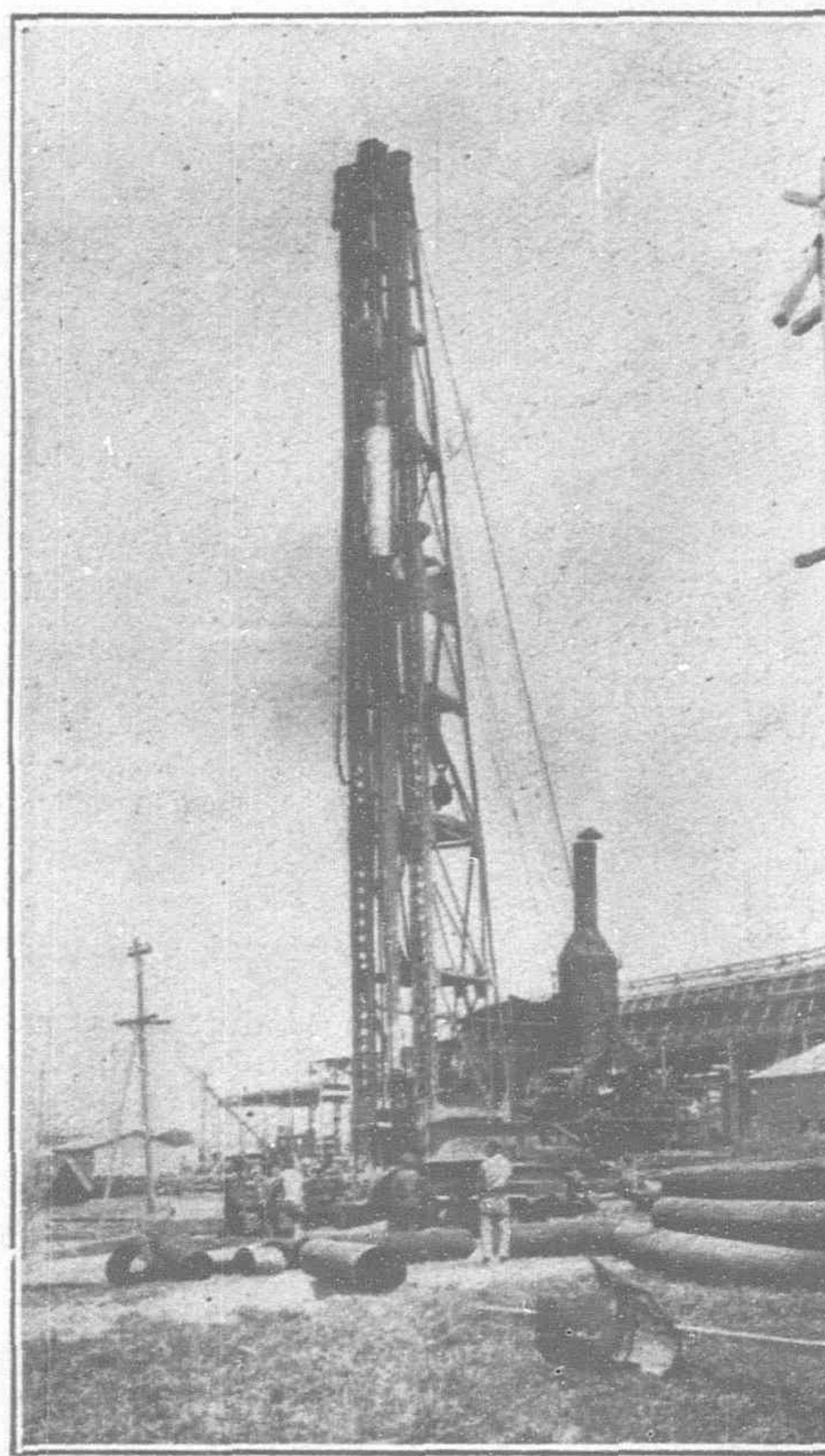
Machinery imports into Japan from the leading supplying countries.

[Values in thousands of yen]

Class of machinery	1924				1925			
	United States	Great Britain	Germany	Total, including other countries	United States	Great Britain	Germany	Total, including other countries
Steam boilers *	1,115	3,926	130	5,473	423	4,040	187	5,839
Fuel economizers	161	430	39	645	—	351	57	518
Steam turbines	1,047	567	53	2,298	829	335	64	1,452
Steam engines	8	14	5	32	41	8	9	60
Gas and petroleum engines †	3,052	885	430	5,572	1,987	1,320	524	5,732
Water turbines ‡	50	130	255	1,463	—	44	205	773
Cranes	494	160	157	827	328	170	48	589
Capstans §	624	230	156	1,044	386	116	133	660
Gas compressors	2,043	113	87	2,444	1,232	155	171	1,759
Pumps	990	334	374	1,949	613	372	376	1,569
Blowers	886	72	279	1,346	196	251	197	677
Hydraulic presses	98	75	11	186	38	2	16	56
Pneumatic tools	536	12	64	657	329	21	23	407
Metal and Wood-working	4,762	1,039	1,378	7,747	4,204	506	739	5,745
Spinning	1,375	7,569	1,435	12,050	296	3,428	829	7,707
Looms	369	293	70	816	224	95	196	608
Tissue-finishing	47	550	492	1,162	20	218	363	656
Knitting	146	40	19	266	182	201	52	466
Paper	811	329	101	1,243	47	131	590	801
Other machinery and parts	23,295	10,242	5,337	43,166	10,979	3,109	2,490	32,545
Total	41,909	27,010	10,872	90,286	22,354	14,873	7,269	68,619

Percentage of Imports Shared by Leading Countries

A study of the foregoing table shows that the participation of the United States, Great Britain, and Germany in the industrial machinery imports of Japan has been as follows: 1924—United States 46 per cent. Great Britain 30 per cent. and Germany 12 per cent. While import returns by countries are still incomplete for



Raymond Concrete Pile Driver, used in Construction Work, Tokyo

1925, the distribution of the market was approximately as follows: United States 42 per cent. Great Britain 28 per cent. and Germany 14 per cent. It will be seen, therefore, that the leadership of the United States in this market is not seriously threatened.

Steady Progress Toward Industrialization

One of the most important factors in determining the market for American machinery in Japan is the state of Japan's industrial development. The degree of progress in this direction determines both the amount and type of machinery which may be sold. It is Japan's ambition to become industrialized to the extent of supplying not only its domestic needs for manufactured goods, but also an important volume of exports. Japan's progress toward the realization of this ambition since the outbreak of the World War has been most noteworthy.

The increased domestic production of goods has stimulated the Japanese market for industrial machinery of all kinds, but the increased activity of the domestic machinery industry has limited the demand for certain classes of imported machinery. As the production of machinery requires a rather advanced state of industrial development, it is natural that progress in this respect would be less marked than along other lines, but considerable improvement has been made.

Government Vigorously Promoting Industrial Development

The Japanese Government has so strongly committed itself to a policy of industrialization and has adhered to this course with such determination that it is safe to assume that products which can be produced economically in Japan, as well as those products essential to national defence, whether they can be produced economically or not, will in time be manufactured locally. The Government is able to control the nature and extent of domestic manufacturing to a degree impossible in perhaps any other country. Subsidies, remission of taxes, and protective tariffs are effectively used to encourage the development of industries. It is possible, however, that such supervision may eventually lead to development along uneconomical lines in certain fields and that severe reactions may develop.

Effect of Domestic Production on Market

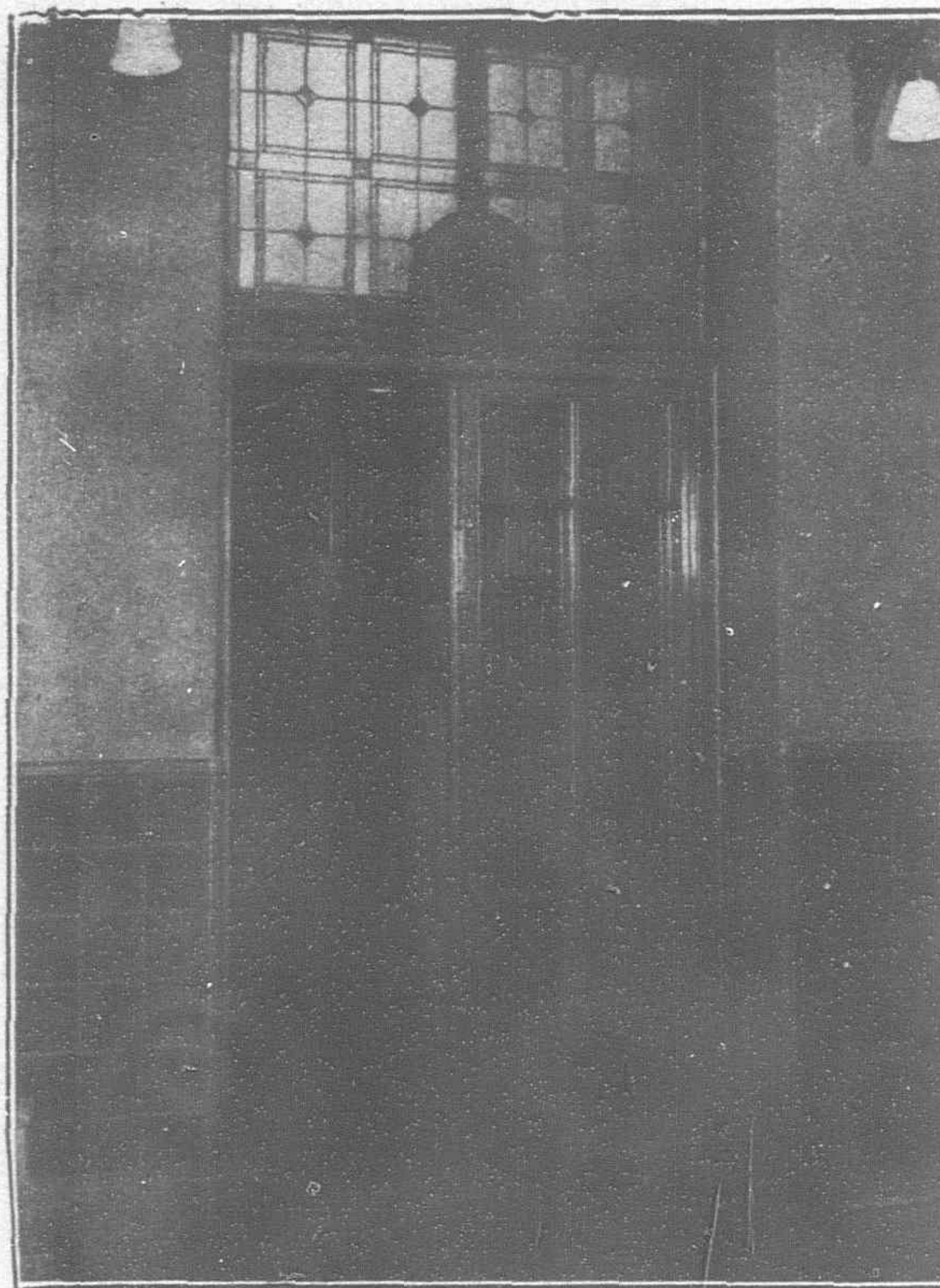
American exports may expect to find a gradual changing of their shipments to Japan from the smaller and simpler types of machines to the larger and more highly developed types as Japan's industrial development proceeds. Nevertheless, for the present and immediate future, it is not probable that Japan's industrial development program will be pushed rapidly, for in many industries over-development is already evident.

It is difficult to obtain reliable up-to-date statistics of Japanese machinery production; however, consideration of the exports of machinery gives an indication of the progress made. While tariffs afford home markets for local manufacturers, they can do little in providing export markets, and the export trade is therefore a fair indication of the economic position of the machine-producing industry. In 1913 Japan imported industrial machinery valued at \$14,939,000 and exported a value of \$857,000; in 1925 imports had increased to \$28,161,000 and exports to \$2,779,000. The industrial machinery exports of the pre-war year represented less than 6 per cent. of the imports, whereas in 1925 the ratio had increased to approximately 10 per cent.

*Includes parts and accessories. †Includes hot-air engines. ‡Includes Pelton wheels. §Includes other winding machinery. ¶Does not include parts of machinery.

Classes of Machinery Exported

The following table of exports of industrial machinery by classes of equipment shows the trend of Japan's exports since 1921 as compared with 1913. The totals have been converted into dollars in order to show this trend more clearly and avoid the fluctuation in the value of the yen during this period. It should be remembered in examining



Micro-Drive Elevator in the Imperial Government Railway Club, Tokyo

these statistics that the type of machinery exported differs widely from that imported, and that the following table includes some equipment that would hardly be classed as machinery in the United States, such as hand-power cotton gins and hand-power looms. The figures for 1923 do not include exports from the port of Yokohama during July and August of that year, as the records for these months were destroyed in the earthquake of September, 1923.

Exports of industrial machinery from Japan.

Class of machinery*	(Value in thousands of yen.)						11 months ending November		
	1913	1921	1922	1923	1924	1925	1925	1926	
Steam boilers...	...	†	591	918	416	100	176	167	204
Pumps...	...	†	274	284	201	265	278	266	248
Metal or wood working	†	389	441	234	603	277	259	232	
Spinning and weaving	352	4,431	5,034	3,801	3,590	3,454	3,077	2,460	
Others	...	... †	1,367	3,568	4,224	2,387	2,900	2,586	2,434
Total	...	...	1,719	9,253	10,901	1,039	7,458	6,771	6,203
Total in thousands of dollars §	...	857	4,465	5,211	3,420	3,072	2,779	2,533	2,572

Trend of Export and Import Trade

Japan's exports of industrial machinery are considerably in advance of those of pre-war years, even if the general increase in prices which has taken place since that time is discounted. The peak of these exports was reached in 1922, with a total value of \$5,211,000, and this trade decreased steadily until 1925. Such a decline from the period of post-war trade expansion does not differ greatly from that experienced in the leading exporting countries and does not, therefore, indicate a weakness in the Japanese industry. This downward movement appears to have been definitely arrested in 1925, with exports valued at \$2,779,000, and exports during the first 11 months of 1926 were slightly in advance of those of the corresponding period of 1925.

The record of the Japanese import trade in industrial machinery is quite similar to that of the export trade, with the exception that the peak of the imports was reached in 1921 instead of 1922. From the 1913 total of \$14,939,000, these imports increased to \$49,626,000 during 1921, and then declined steadily as follows: 1922, \$44,692,000; 1923, \$37,821,000; 1924, \$37,189,000; 1925, \$28,161,000. The returns for the first 11 months of 1926 indicate that this decline has now been halted, for imports during this period amounted to \$31,806,000 as compared with \$27,345,000 for the same period of 1925, representing a gain of \$4,461,000.

Distribution of Japanese Exports

The distribution of Japan's machinery exports is shown in the following table. Owing to incomplete returns for 1925 and 1926 the figures for the various countries of destination are for all machinery, and only in the totals has it been possible to segregate industrial equipment.

Exports of machinery from Japan, by countries.

Country of destination	(In thousands of yen).							11 months ending November	
	1913	1921	1922	1923	1924	1925	1926	1925	1926
China	1,206	7,621	9,637	5,418	4,612	4,852	4,406	3,785
Kwantung Province	...	425	2,723	2,999	2,165	3,680	3,454	3,250	3,265
Hongkong	...	151	334	356	240	240	345	334	75
British India	...	113	1,068	621	527	480	430	398	264
Dutch East Indies	...	223	163	106	51	26	24	23	42
Asiatic Russia	...	18	287	209	133	41	18	16	185
Australia	...	11	190	81	122	169	51	48	52
Others	...	375	496	500	606	384	512	454	400
Total	2,522	12,882	14,509	9,262	9,632	9,686	8,929
Non-industrial machinery	803	3,629	3,608	2,223	2,174	2,915	2,726
Industrial machinery ¶	¶	1,719	9,253	10,901	7,039	7,458	6,771	6,203	5,480

Measures Taken to Promote Japanese Industry

As previously indicated, the present tendency on the part of the Japanese Government is toward the encouragement of home industries as far as is consistent with the general financial situation. National Government committees are continually investigating the various aspects of this problem. The following measures are some of the more important which have been suggested by these committees:

In order to encourage the manufacture of precision machinery, workmen are to be specially trained in the production and use of precision machines. Certain mills of superior efficiency are to be assisted by the Government to maintain operation up to their production capacity.

It is suggested that special attention be given to encouraging the manufacture of water tube steam boilers, steam turbines, gasoline and Diesel engines, and water wheels. A tariff revision and a subsidy for experimental work are proposed for this purpose.

(Continued on page 460).

*Figures include parts of machinery.

†Not separately classified.

‡Includes cotton gins, 125,000 yen.

§Conversion rates: 1913, \$0.4985; 1921, \$0.4825; 1922, \$0.478; 1923, \$0.4858; 1924, \$0.4119; 1925, \$0.4104. Eleven-month periods: 1925, \$0.4083; 1926, \$0.4694.

¶Includes sewing machines, parts and accessories.



Springfield Road Roller used in Street Construction Work in Tokyo

Tokyo-Yokohama Highway*

J. H. Ehlers, Member A.C.A.E.

THE opening of the Tokyo-Yokohama highway for through automobile traffic marks an interesting point in the development of a comprehensive road-building program in Japan, the completion of which may result in a motorization of traffic comparable to that of many European countries.

The highway is called the Keihin National Road, and is a part of the projected road from Tokyo to the famous Shrine of Ise, west of Nagoya. The project was seriously brought forward in 1918, and an appropriation of Y.1,386,000 was then made for building the Kanagawa Prefecture section of the road. Owing to increasing traffic demands, the plans were changed entirely before the construction was started and an additional appropriation of Y.1,449,000 was made. After other revisions of plans, the work was started in 1921 and proceeded slowly. The disastrous earthquake of September, 1923, greatly retarded the progress of the work. At the present time the road is entirely completed from Tokyo to the city limits of Yokohama.

The highway connects with the main streets of Tokyo and Yokohama, which form a part of it within their respective city limits but do not conform to its dimensions. The total length of the road from Yokohama Station to Hibiya Park, in the heart of Tokyo, is approximately 18 miles. Between city limits the length is 10.8 miles.

On the Tokyo end of the highway, outside of the city limits of Tokyo, the road has a width of 45 shaku, with an additional covered gutter on each side 1½ shaku wide, making a total width of 48 shaku from curb to curb. (1 shaku equals 0.994 foot). On each side of the road is a sidewalk approximately 11 feet wide and beyond each sidewalk is a 1½ foot covered drainage ditch connected with the main gutter at intervals of 40 shaku by drainage pipes passing under the sidewalk. The road is built with a crown of 1 in 30 in some parts and 1 in 40 in others. The paving consists of a 6 inch concrete base and a 2½ inch wearing surface of asphalt concrete.

On the Yokohama end, outside of the Yokohama city limits, two cross sections are found. More than half the length from the city limits northward has a 60 foot roadway, curb to curb, with two 15 foot walkways. The remainder has a 40 foot roadway, with a crown of 1 in 30, and two 15 foot walkways. One

part of this end of the highway has a 5 inch cement concrete base and a 2 inch asphalt concrete wearing surface. The remainder has a 5 foot broken-stone base laid to two thicknesses, each thoroughly rolled with a 10 ton roller, with stone screenings rolled in, and a 2 inch asphalt concrete surface.

The grades are very slight, about 1 in 200 being usual. Grades steeper than 1 in 100 are found in a few places and for distances of a few hundred feet. There are no sharp curves between the city limits of Yokohama and Tokyo.

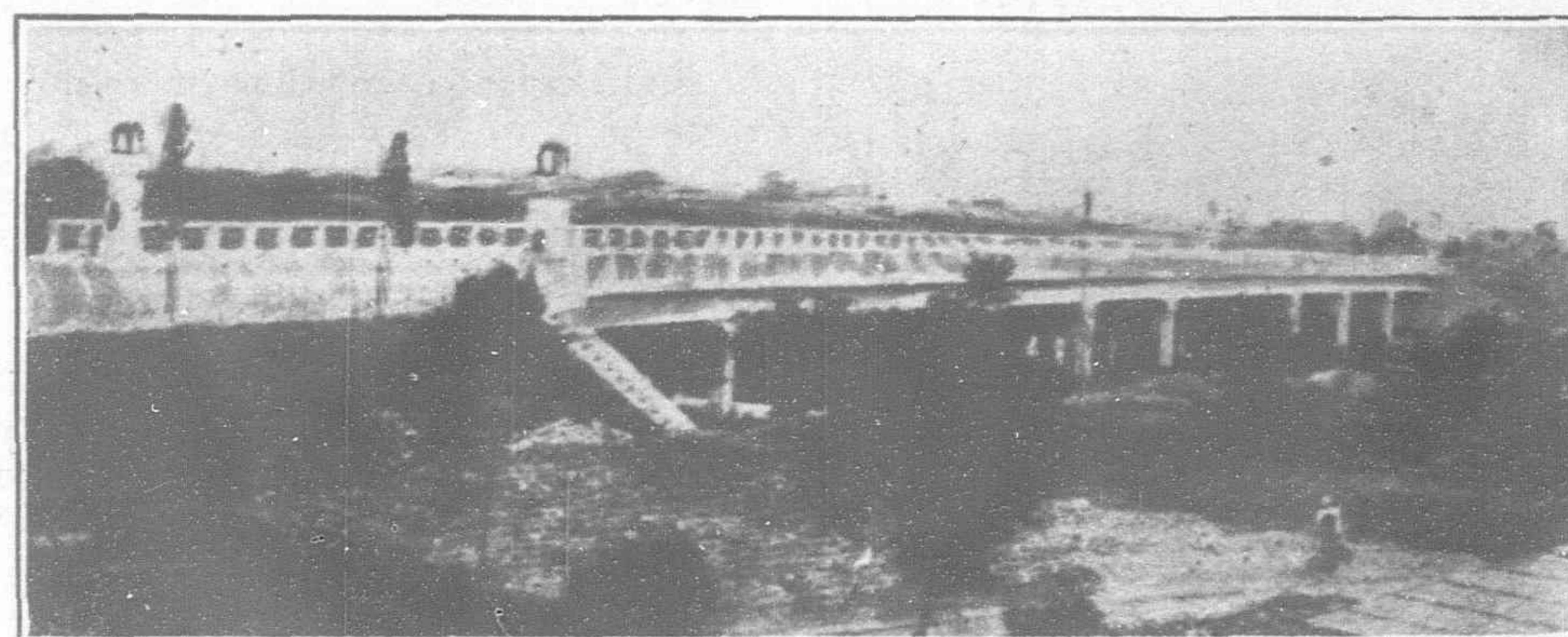
The bridges are permitted to carry 12-ton autotrucks as a maximum load. The following bridges are found on the highway between city limits:

Bridge	Length	Width of sidewalk on roadway	Width of sidewalk on either side
Tokaibashi .. .	14.25	8	2
Tachigawabashi .. .	4.25	8	2
Yawatabashi .. .	3.0	8	2
Omoribashi .. .	6.1	8	2
Meotobashi .. .	{ 8.0 2.5	8 8	2 2
Rokugobashi .. .	245.4	6	1½
Shinkaiwabashi .. .	3.0	8	2
Tsurumibashi .. .	60.0	5	1½

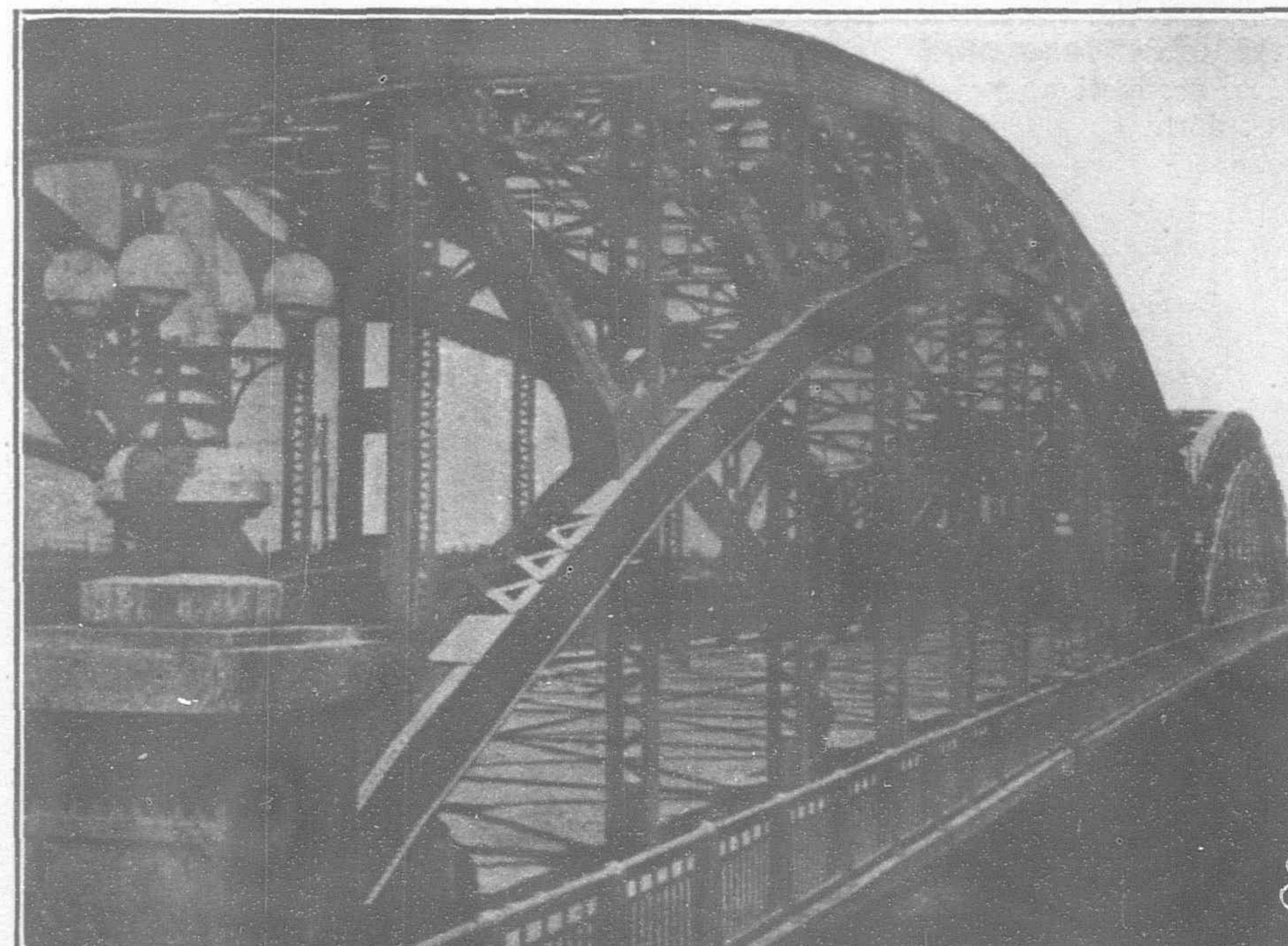
The most notable bridge is the Rokugobashi, having a total length of 1,464 feet. It consists of two 2-hinged spandrel-braced steel arches, each 222 feet span, center to center of piers, with suspended roadway, and 17 plate-girder spans of 60 feet each, with concrete roadway. This bridge cost Y.1,020,000.

No special traffic and driving regulations have yet been framed for this highway. Certain rules regarding lanes of traffic and other matters are expected to be devised. The usual maximum speed limit of 16 miles per hour, and 12 miles per hour on roads of less than 36 feet width, applies.

The highway is entirely completed from Tokyo to the city limits of Yokohama. From these limits to the center of Yokohama it is necessary to use about 2 miles of comparatively narrow streets, including one temporary bridge. This bridge is of 20 foot span and will safely carry loads up to 8 tons. The road is open



The Tsurumi Bridge



The Rokugo Bridge

* "The Oriental Engineer."

throughout its entire length for all kinds of automotive traffic, and the trip from Tokyo to Yokohama is ordinarily made in about one hour.

Heavy duty trucks and motor-buses may travel over the route without any unusual difficulty except that of using the few miles of, and turning several sharp corners in, the somewhat narrow village streets inside of the Yokohama city limits. Traffic is extremely dense on the section of the road through Kanagawa inside the city limits of Yokohama. Automobiles, motor cycles, bicycles, horse drawn carts, man drawn carts and rickshas, as well as pedestrians, use this 18 foot wide road.

The 10.8 miles of construction outside the city limits was done by the prefectural offices, 4.2 miles by the Kanagawa office and 6.6 miles by the Tokyo office. Several miles of the highway within the city limits of Yokohama were taken over by the reconstruction bureau of the Imperial Government, which is still engaged on the construction of this direct route into the center of Yokohama. Contracts were let for minor parts, such as drains and gutters.

About Y.11,000,000 (about \$5,483,000) was appropriated for that part of the highway undertaken by the prefectural offices. This amount included the sums required for the purchase of right of way.

The special significance of this road lies in the fact that it is the first real modern automobile road out of Tokyo. Only a few years ago a narrow village road, crowded with traffic and poorly surfaced and therefore impracticable for automobile traffic, was the only highway between these two important cities. The new road has a special interest for Americans because of the possible increase in sales of American automobiles and motor cycles. At present, as far as individual purchasing power, road conditions, and time-saving requirements in transportation are concerned, Japan is still in the bicycle stage—there are approximately 40,000 automobiles and 4,000,000 bicycles in Japan proper.

Inasmuch as Tokyo and Yokohama have 15,000 automobiles, the building of this highway may have far reaching effects in popularizing automobile transportation. It may make popular the owner driven car, which is now rarely seen, and may give a decided impetus to motoring for pleasure. The use of automobiles now is retarded by the unusually high annual license fees for cars registered in Tokyo, about Y.617 (\$307.50) a year for an American car of average size, or about four times the fee in any other part of Japan.

The Industrial Machinery Market of Japan

(Continued from page 458).

In spinning machinery it is suggested that subsidies be granted to encourage co-operation and for the purpose of standardizing types.

To encourage machine tool production, radical tariff revisions upward are suggested, particularly on precision machine tools. Subsidies are also suggested to promote standardization.

Market for American Machinery

In view of the changing aspect of the Japanese market, a discussion of the field for certain classes of American industrial machinery may be helpful. The United States secures its largest share of the market under the heads of metal and wood working machinery and gas and petroleum engines, and leads all other countries in the supply of these items. As the machinery industry of Japan develops the smaller and simpler types of such equipment are being produced locally, but a market continues for the larger and more highly developed types. Likewise, steam turbines up to 5,000 kw. capacity are being manufactured by a large establishment in Japan, but American turbines in the larger sizes find a fairly good market. A field also exists for cranes of special types, compressors, and concrete mixers for the larger construction work. Local manufacture supplies the demand for the smallest types of concrete mixers.

The Japanese are making rapid progress in the manufacture of pumps, and the only important market for the imported product is for the larger types. One or two well-established makes of American pumps are still able to compete in the smaller sizes at a price at least 25 per cent. above the Japanese products, on the basis of their recognized quality.

Textile Industry May Require New Machinery

The textile machinery market also presents some possibilities. Although spinning machinery is locally made, the shortening of the working hours may result in a demand for foreign machinery. At present the consumption of cotton per spindle in Japan is greater than that of any other country. (In this connection it should be remembered, of course, that in some instances Japanese mills work 22 hours out of 24.) Japan has made remarkable strides in cotton spinning during recent years and in number of spindles now ranks seventh among the leading spinning countries of the world. Japan also controls about 40 per cent. of the spindles in China. Future development may demand a considerable change in this industry, including increase in the amount of machinery. The spinners must produce finer counts and better quality, and can not do so without improved conditions, more skilled labor, and better trained operatives, which will likely call for a shortening of the hours of labor, reducing the number of shifts and the consequent increase in the machinery required.

Possibilities in Many Types of Machinery

The market for heavy construction equipment and steam shovels is comparatively good. Steam pile drivers are also in some demand. The market for pneumatic tools should improve, as most attempts at manufacturing them locally have not been successful, and the foreign product is much preferred.

The larger sizes of road rollers find some market, although they are being made locally to a certain extent. Many American road rollers are seen in the streets of the principal cities. Cement-making machinery is manufactured locally; plans are being formulated, however, for the production of a special grade of cement, and, as it is not probable that the necessary equipment can be supplied locally, some demand may result for American cement-making equipment. The fish and crab canning industry is very active. At present, it has fully as much machinery as is required, but in the larger plants there is some demand for the most up-to-date automatic machinery. This is a growing, progressive industry, and American machinery is preminent in the field.

The Chinese in Foreign Lands.

THE presence of a few hundred thousand foreigners in China has become a problem of the most serious international politics, but the fact is often overlooked that Chinese have been settling in foreign countries with increasing mobility. The following statistical description of the movement of Chinese out of their own Middle Kingdom is significant in view of the attitude of certain Chinese that all foreigners should immediately pack their bags and leave China never to return:

The Chinese Ministry of Foreign Affairs has received reports from Chinese Consuls abroad showing the number of Chinese residents in various countries and towns, as follows:—

Australia, 20,826; Philippine Islands, about 40,000; Peru, about 9,000; Korea, about 30,800; New York and San Francisco, 41,995; Batung (Dutch East Indies), 100,373. Reports from other Consulates have not yet arrived. From unofficial sources the following figures have been obtained:—Canada, 12,000; Burma, 130,000; Hongkong, 444,644; Dutch East Indies, 1,835,000; Siberia, 25,000; European Russia, 71,021; the United States, 150,000; Malay Archipelago, 93,000; Java, 27,000; French Indo-China, 1,030,000; total of all overseas, including places not above mentioned, 9,634,000.

The question has been asked, "Why do foreigners come to China?" And the same question might be asked in reply, "Why do Chinese leave China?" To both questions, there is but one answer, namely, trade! As trade conditions in China become more difficult, enterprising Chinese leave their own countries for places, where they can enjoy greater security to life and property and a more equitable opportunity to get a just return on their labor and investment than they can possibly find in their own country. The interesting fact appears that in spite of the vastly advertised Chinese hatred for Great Britain, 700,000 Chinese are to-day living under the British flag. While at the moment that the United States is being denounced for its capitalistic imperialism, almost 200,000 Chinese are living under the Stars and Stripes.

Methods Employed by the Kailan Mining Administration[†]

By S. C. Huang, E. M., Engineer, Tongshan Mine

THE mines operated by the Kailan Administration are five in number, namely, Tongshan, Machiakow, Chaokochwang, Linsi and Tangchiachwang.

Under normal conditions, the daily output of the mines are as follows : Tongshan, 2,500 tons ; Machiakow, 3,500 tons ; Chaokochwang, 8,500 tons ; Linsi, 5,000 tons ; and Tangchiachwang, 2,000 tons. At present, the mine at Tangchiachwang is an infant in development, but its daily output will be increased to 4,000 tons in the next two years.

All the mines are situated along the Peking-Mukden Railway line, and connected with the latter by branch lines at Tongshan, Kaiping and Kuyeh stations, whence the coal is shipped. For shipping coal to other ports by sea, the K.M.A. has one of the most favorable seaports in North China at Chinwangtao, which is less than 80 miles east of the mining area.

Geology of the Kaiping Basin

The geology of the famous basin of Kaiping, exploited by the K.M.A., has been thoroughly worked out by our former geologist, Mr. F. Mathieu. The following are abstracts from his paper on this basin.

The general stratigraphy of the Kaiping coal basin, as identified by Mr. Mathieu, consists of the following subdivision :

Shansien Series

Zone of Hung Ho—Sterile
Zone of Tangchiachwang—Poor
Zone of Chaokochwang—Rich

Taiyinian Series

Tongshan Limestone
Zone of Tongshan—Poor

On the whole, the flora found in the coal seams are of the Stepheno-permian age, whereas in the zone of Tangchiachwang, a flora of distinctly Permian character has been conspicuous.

The marine sediments in the zone of Chaokochwang yield a fauna of the Permian age, while the Tongshan limestone is of the Dinantian, without having any disconformity between these two formations.

The faunistic strata have been well localised from the mining operations, and the majority of the vegetal fossils, obtained from the dumping, determined. It is very important, as much from a scientific point of view as from a mining standpoint, to be able to make a systematic study of the distribution of flora in the seams as is being done for the Franco-Belgian coal basins. This is a Herculean task which demands the continuous collaboration of technical experts of the mining industry.

Structure

In general, the Permian coal deposit of Kaiping forms a synclinal basin, trending N-E, underlain by the Ordovician limestone and superposed by the Permian-triassic coal strata of Kuyeh. The coal formations follow, generally, nearly without interruption, up to the northern border of the basin from Machiakow to Chaokochwang ; while in the region of Tongshan and west of Linsi, it is partly covered by loess and other superficial formations.

At the southern flank of the basin, in the region of Linsi, the seams dispose themselves regularly in inclined beds of 16°-24° toward the bend of the basin. On the northern border, and more particularly in the line of the shafts of the Chaokochwang mine, the inclination of the seams is very great ; between these shafts and those of the Machiakow mine, the seams are sometimes vertical or over turned. The basin is indeed very asymmetric.

Near Kaiping, the tilting of the seams has reached its maximum. In the region of Tongshan, the structure of this deposit assumes a peculiar form, which may be termed "The Hernia of N-W Shaft," resulting from the accentuation of a fold, at the kernel of which is located the N-W Shaft mine. Reverse folding has also been observed in the region exploited west of the shafts of Tongshan mine.

Faults, less important in the northern portion of the basin, except at its elbow between Tangchiachwang and Linsi, play a remarkable part from Tongshan to Machiakow, where it has been observed that they exist in sub-parallel systems, having a general direction of N-N-E.

Coal Seams

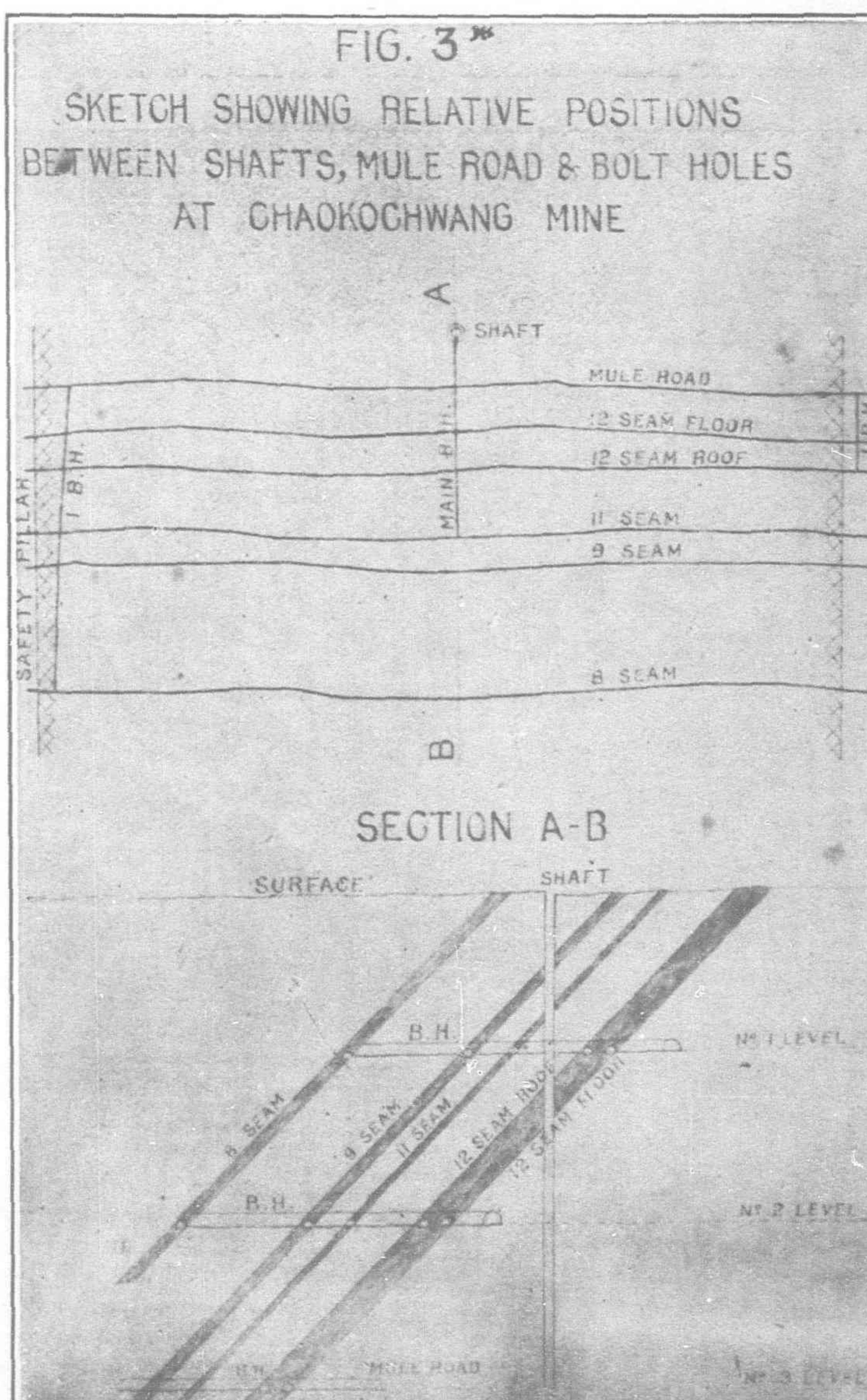
The coal seams are some twenty in number, the six or seven of these exploited are found within the zone of Chaokochwang, and these are notably Nos. 5, 8, 9, 11, 12, 12 (branch), and 14.

The coal of the Kaiping basin is bituminous, burning with a long flame, and can be used in the manufacture of metallurgical coke.

After a series of observations made on the mode of the coal occurrence, Mr. Mathieu has made the following conclusions, in favor of the origin of primary deposition.

1.—The coal in some cases presents a rather high ash content, surpassing that of the coal from basin of primary type.

2.—Frequently the thick seams divide themselves into many others, and the country



[†] "The Oriental Engineer."

* The graphs are numbered by the author. Omitted numbers have not been supplied.

rock, the "stampe," between the branches has been found to be torrential in character.

3.—Some of the seams assume a lenticular form. Very commonly, small coal lenses are found isolated in the barren floor rocks.

4.—The existence of barren formations of torrential origin in the seams is indicated by cross-bedding, the presence of conglomerates, of polished pebbles, of disseminated metallic sulphides, and of transported tree trunks, etc., and sometimes evidences of incomplete carbonification of the vegetal debris imbedded in these torrential sediments are observed.

Igneous Intrusions

At the elbow of the basin, between Linsi and Tangchiachwang, Tertiary intrusions manifest themselves in the form of dykes of basalt and lamporphy, piercing sharply into the coal formations. The metamorphic reactions of such intrusive rocks at the contact of the seams are indicated by :

- .1.—The columnar structure of the metamorphosed coal.
- .2.—The reduction of the tenor of volatile matters, and the presence of natural coke.
- .3.—The reduction of the coking power of the coal.
- .4.—The increase of ash and sulphur contents in the coal at the zone of contact.
- .5.—The limited extent of the zone of contact metamorphism, which is not wider than a meter.

For further information on the geology of the Kaiping Basin, one may refer to Mr. Mathieu's article on the subject, in "Publications de l'Association des Ingénieurs, de l'Ecole des Mines de Mons," Année 1923.

Underground Arrangement Level Intervals

The determination of the distance between levels depends upon a number of factors, namely, the angles of inclination of the important seams, the country rock formation, the mining methods applied, and the occurrence of spontaneous fires underground.

Coal seams of the same basin may be highly pitched, or flat, as a result of local or regional geological movements. The country rock formations may be hard sandstone or soft shale. These will determine the methods of mining the deposit, hence the fixing of the level intervals.

The table shows the depth of the mines of the K.M.A. and the level intervals have been determined with the same factors carefully considered.

Intermediate Levels

The reasons for opening up an intermediate level are numerous. In the K.M.A. mines, these sub-levels are opened mainly in the portions of the mines where low-pitching seams exist, as the slope distance along the floors of these seams between two main levels will become so long that the maintenance cost will be prohibitive.

On account of the fact that No. 5 seam in Linsi has a low inclination, 12°-18°, hence a long jenny way is necessary, it is developed by an intermediate level halfway between two main levels cut along the dip of the seam partly in coal and partly in the floor rock. The jenny way is cut in 6-ft. by 8-ft. section, and serves as a passage for transporting coal from the stalls to the haulage level. It is provided with double

tracks, and self-acting brake pulley installed in a room at the upper end of the jenny way. Empty tubs are hauled up by the pull of the heavy or loaded tubs going down.

Depths of the K.M.A. Mines, and Level Intervals.

Level	Mine	Tongshan	Linsi	Machiakow	Chaoko-chwang	Tangchiachwang
No. 1 ..		194.70' 59.38m	260.00' 79.30m	334 30' 101.89m	291 36' 88.80m	453.00' 138.07m
No. 1-1/2 ..		—	—	493.00' 150.36m	—	—
No. 2 ..		284.10' 86.65m	399.11' 121.72m	640.59' 196.37m	579.36' 176.58m	—
No. 3 ..		546.00' 166.53m	593.40' 181.00m	841.68' 256.71m	835.08' 254.53m	—
No. 4 ..		725.00' 221.10m	725.49' 221.27m	983.40' 299.93m	1,126.25' 343.35m	—
No. 5 ..		900.00' 224.50m	927.24' 282.62m	1,180.80' 359.91m	1,419.00' 432.51m	—
No. 6 ..		1,071.10' 326.66m	1,125.05' 342.91m	1,377.00' 419.81m	1,703.94' 519.31m	—
No. 7 ..		1,267.60' 386.66m	—	—	—	—
No. 8 ..		1,466.00' 446.79m	—	—	—	—
No. 9 ..		1,659.75' 506.02m	—	—	—	—
No. 10 ..		1,898.28' 578.58m	—	—	—	—

In Tangchiachwang mine, there is an intermediate level, called the half level, which was intended for prospecting. As the inclination of the seams increases to 35° in the western section of the mine, the intermediate level has not been cut beyond that point.

In the colliery at Chaokochwang, intermediate levels are opened up where the seams have an inclination of about 20°. On these intermediate levels, headings for hand-tramming are pro-

vided with double tracks. Stone bolt holes are cut to meet the seams. The output from the coal places on these levels are sent down to the main levels either by means of self-acting inclines, or by blind pits equipped with drop cages.

Mule Roads

The choice of the right location in establishing a mule road is very important. If properly located, its life may be indefinitely prolonged, otherwise, great expense for repairs and maintenance will incur, and the difficulties in transportation will affect the production.

As a rule, in the K.M.A. mines, the mule roads are cut either in small seams or in rock. The small seams, in which mule roads are cut, must be so located on the floor side of all the workable seams that the working of the latter will not effect the conditions of the mule roads, and this plan has been proved satisfactory in all respects.

The mule roads are cut with a section of 7-ft. by 9-ft. or more, and are supported either by timber sets, brick and stone arch, or by reinforced concrete arch. Double tracks of 16-25-lb. rails are laid with gauges of from 18-in. to 2-ft. in the different mines at a grade of 0.5 per cent. in favor of the load. Water drains, 1-ft. by 2-ft. or 2-ft. by

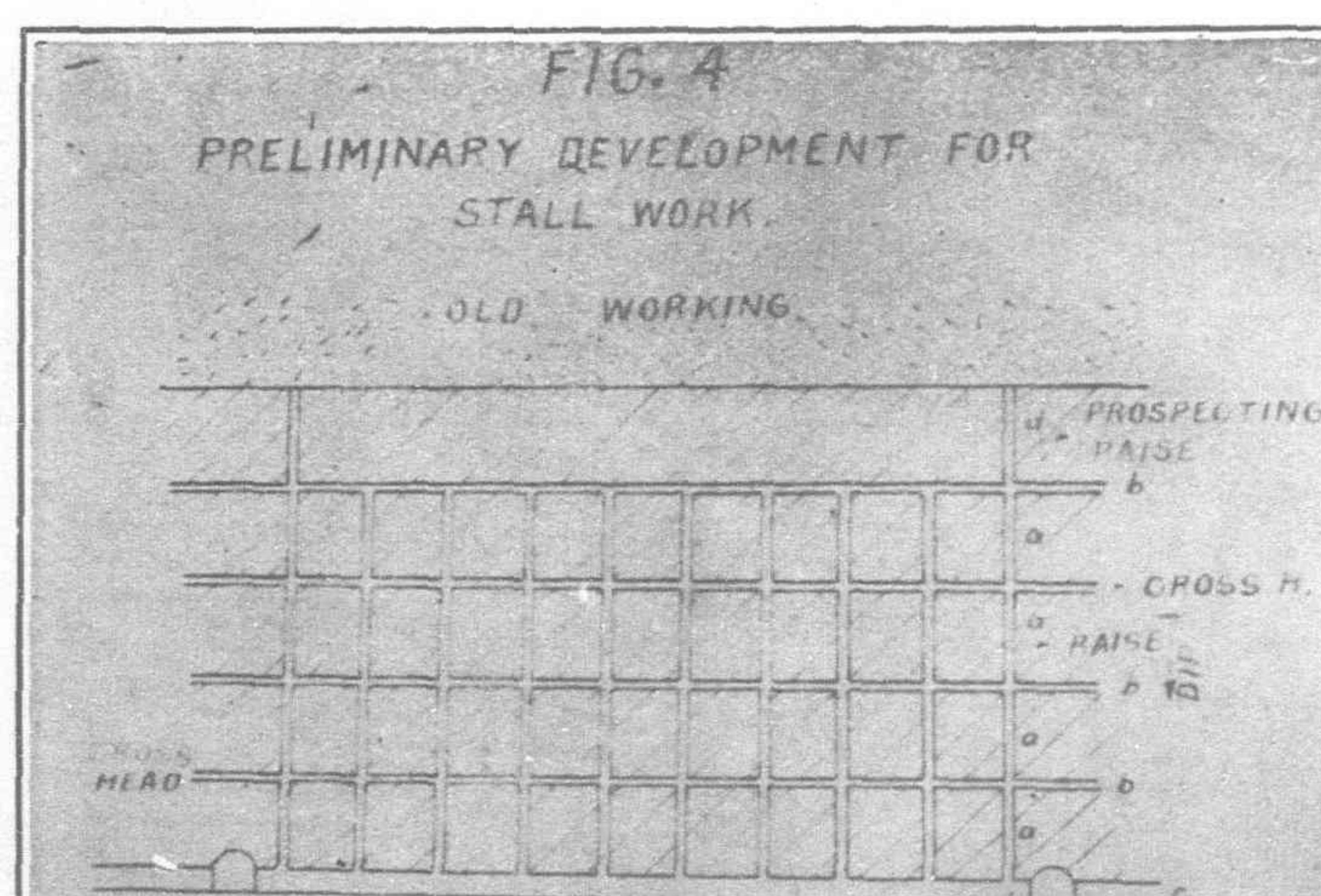


FIG. 5
THE WORKING OF STALL
e - COAL BOLT HOLE; f - STALL RAISE; g - ROOF RAISE; j - ROOF
HEADING; m - MID. HEADING; n - MID RAISE.

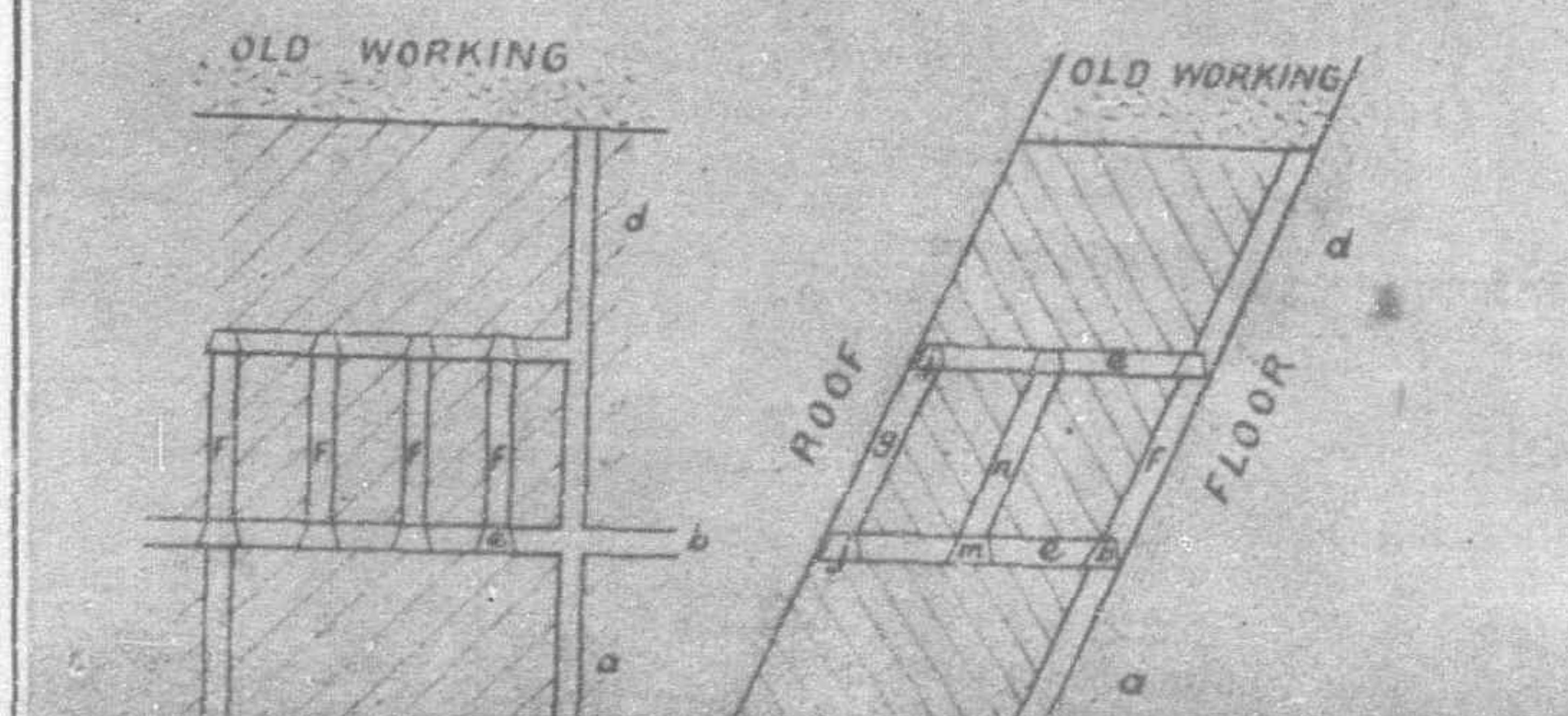
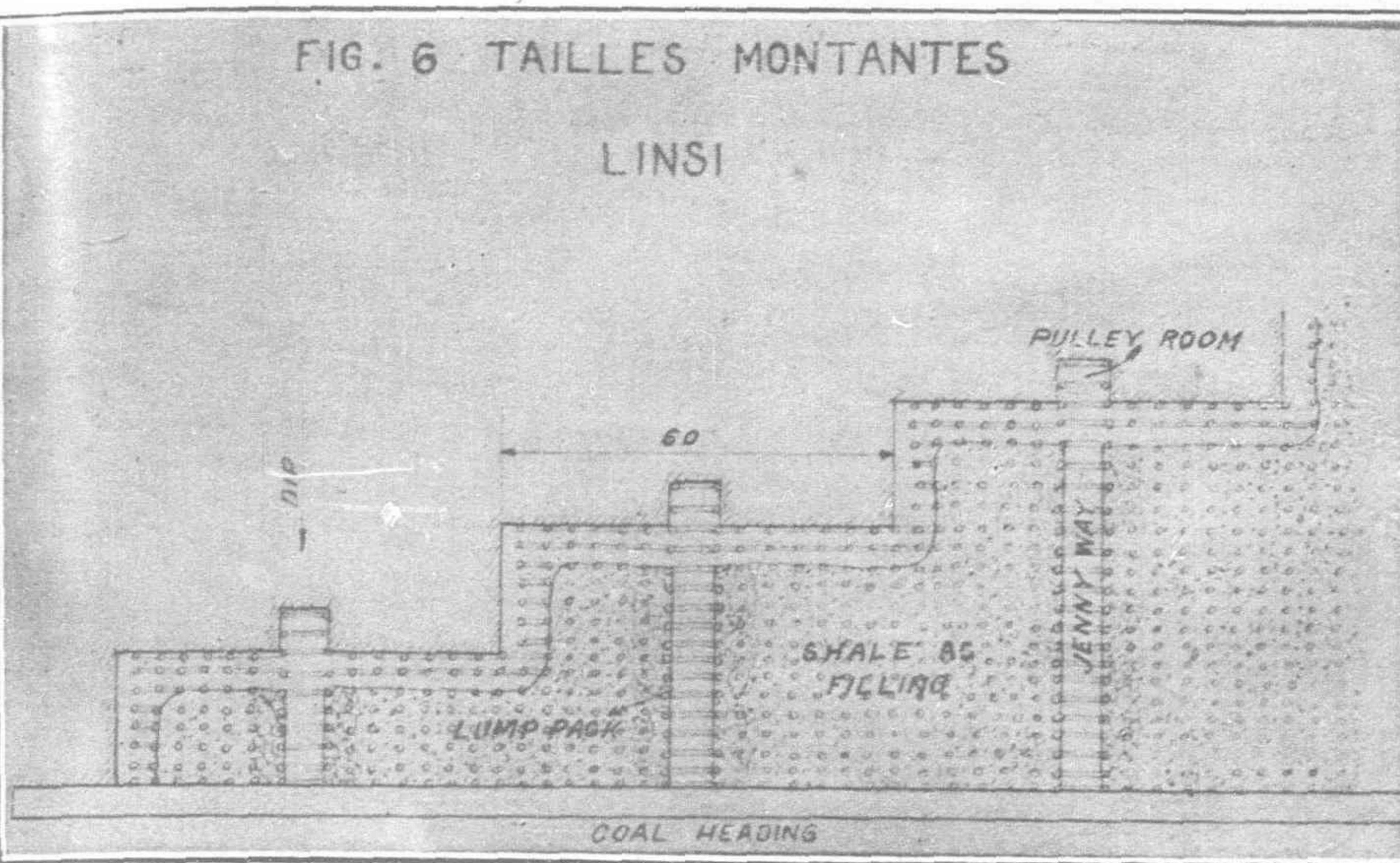


FIG. 6 TAILLES MONTANTES

LINSI



4-ft. in section, are cut along the mule road on the side of the track for the empties.

No. 13 Seam Used

Previously in Tongshan mine, the mule roads were cut in No. 5 or No. 6 seam. No. 13 seam, in which the mule roads are located at present, was not chosen because of the fact that the pumping installations then were not strong enough for handling the considerable quantity of water therein encountered. This seam has a strong roof and floor, and it has been found that though it may be costly to cut it is easy and cheap to maintain, as compared with a mule road in either No. 5 or No. 6 seam. In Chaokochwang mine, the mule roads are all driven in No. 13 seam, and for the most part of them, no support whatever is required. In Linsi, they are located either in No. 12 or in No. 13 seam, and they are supported with timber, sets, and arch.

Bolt Holes

Bolt holes are crosscuts, 6-ft. by 6-ft. in section, driven in country rocks either for the purpose of prospecting, or intersecting the seams known to exist so as to afford a connecting passage between the seams and the mule roads. They are generally spaced at 500-ft. to 600-ft. intervals, but sometimes the distance between two consecutive bolt holes may be lengthened to even 1,000-ft. when the local conditions are in favor of such a change.

They are usually cut perpendicularly to the strike of the strata on one or both sides of the mule road, and are supported with timber sets, reinforced concrete arch, or brick and stone arch according to their importance in transportation, the rock formations, and the time duration at which their services are desired. When room is required for laying double tracks, and drainage, the bolt holes may be enlarged to a section of 78-ft. by 8-ft.

At the intersections of the bolt holes with the seams, coal headings, 5-ft. by 5-ft. in section, are driven either along the floor or along the roof to connect the bolt holes for transportation as well as ventilation purposes. There are slanting bolt holes and air bolt holes for ventilation.

Character of Rock

The rock formations between the different important seams, as exposed by the bolt holes are generally as follows:

- Between No. 13 and No. 12 seams sandstone or sandy shale.
- Between No. 12 and No. 9 seams sandstone and psammite.
- Between No. 9 and No. 8 seams soft sandstone easily decomposed.
- Between No. 8 and No. 5 seams shale.

For all the K.M.A. mines, the hoisting shafts, the mule roads, and some of the bolt holes constitute the general inlet airway. The general return airways, consisting of stone bolt holes and inclined passages, are usually cut in some small seams with a good floor and roof, and are solidly supported with masonry or timber sets. The foul air is led by these airways to the exhaust shaft. The location and the general arrangement of such general return airways are different in different mines.

Airways

In Tongshan colliery, these airways are cut, 6-ft. by 6-ft., in No. 5 seam and arched. Special airways leading directly to the general exhaust are provided in No. 13 seam for the return air from No. 9 level workings. There is a separate airway for each seam at every bolt hole on each level.

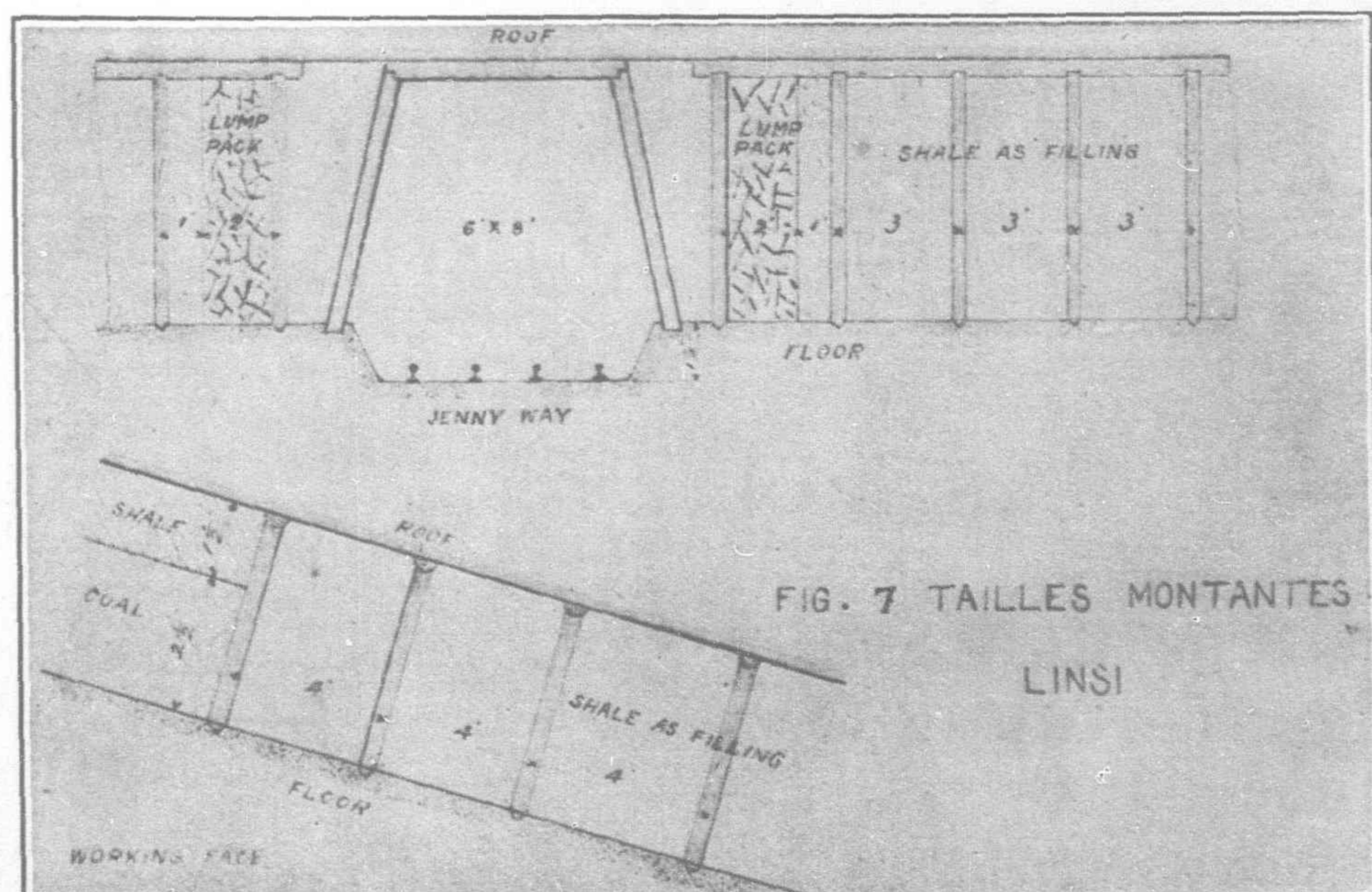
In Linsi colliery, the general return airway, 6-ft. by 6-ft. in section, is located in No. 11 seam.

At Tangchiachwang, there is an air pit on the hillside. This pit was originally intended for prospecting, but is now used as an upcast. In winter, up to now, due to the difference in elevations between the mouth of the air pit and those of the other shafts, natural ventilation is employed. The air current entering by No. 1, No. 2 and No. 3 pits passes through all the workings on the first level, and through the coal workings to the main drift on the intermediate level, and then up to surface by the prospecting pit.

In Chaokochwang mine, the general return airways are cut in No. 13 seam within the shaft pillar, and one on each side of the shafts. At a distance of 50-ft. above No. 13 seam mule road on each level, the airways branch out and follow the mule roads. At every two bolt hole distance, a stone air rise and bolt hole, cut in a small seam and 50-ft. above the level is provided for collecting the return air from that section of the mine, and sending it to the general return airways above No. 13 seam mule road; and there the return air of the mine passes into the main airways in the shaft pillar. As these airways are cut in sandstone, they are seldom timbered.

Firedamp Precautions

In general, in all the mines, excepting Tangchiachwang, there are two such general airways, one on each side of the shafts, and in the shaft pillar. They lead separately and directly to the exhaust fan, thus constituting two distinct exhaust systems for the return air from their respective coal workings. In case of any mishap in one of these systems, the entire volume of the return air from all the mine workings can be led through the other general airway to the fan.



In case firedamp is detected, in certain workings in the K.M.A. mines, the ventilating current is increased for that part of the mine by secondary fans driven by small electric motors of 6 h.p. on movable trucks. The number of fans required varies with the circumstances. For all the mines, 25 secondary electric fans have been put in operation.

Depth of Shaft

The number of shafts at each mine is fixed by the maximum output that the mine is capable of producing in that particular area, and the depths to which the shafts are sunk are determined by local conditions. Practically all the shafts, excepting the No. 4 pit at Linsi, which has a square section for a few hundred feet below the surface, are of the circular type. The shafts are lined either with bricks, stone blocks and bricks, or bricks and concrete. The diameter of the shafts ranges from 11-ft. to 18-ft. 6-in. The following tables show the dimensions and depths of the shafts of the mines.

Table showing the Dimensions of Shafts

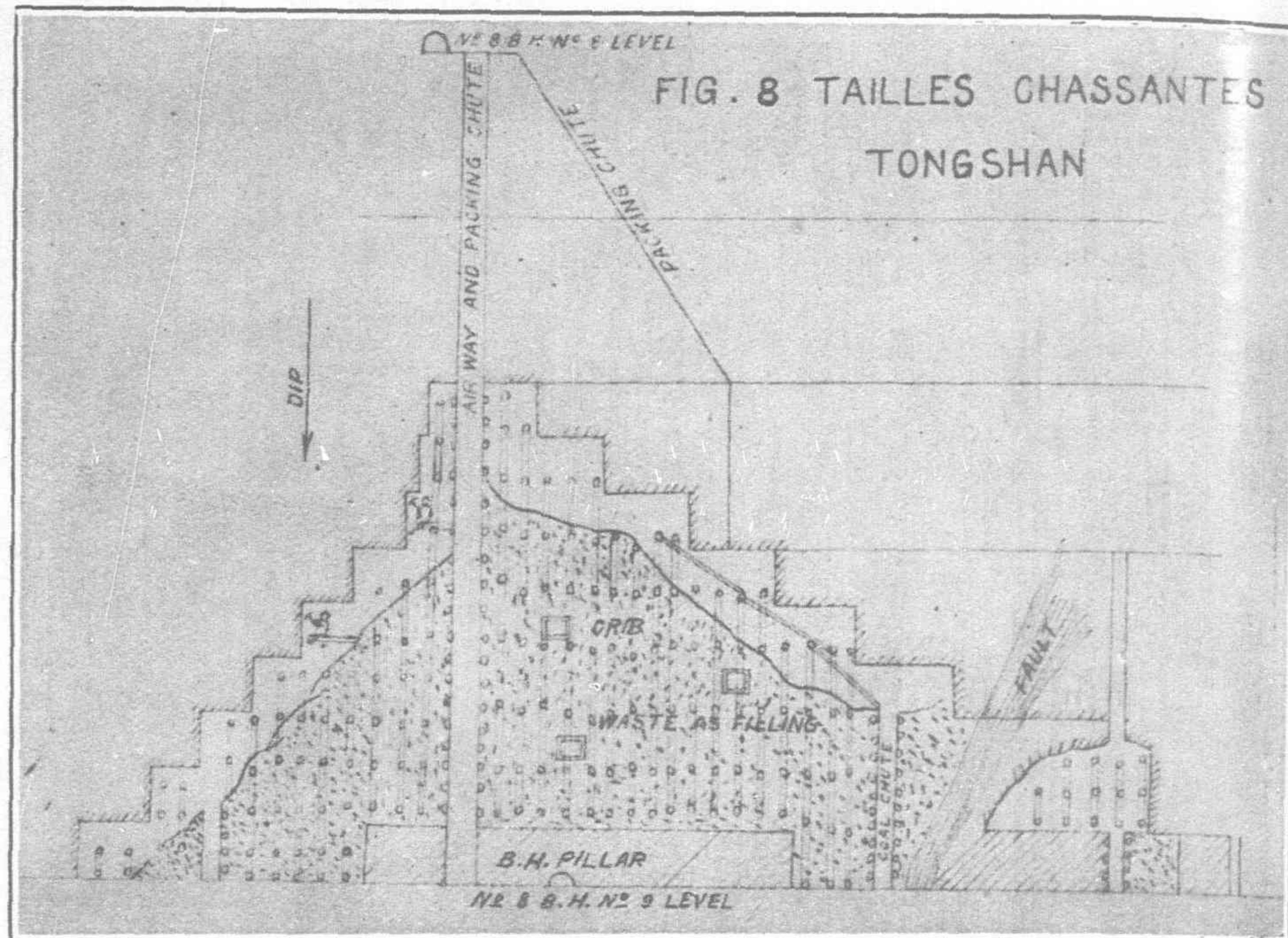
Mine	No. 1 Shaft	No. 2 Shaft	No. 3 Shaft	No. 4 Shaft	Pros. Shaft
Tongshan	.. 14'	14'	16'	—	—
Machiakow	.. 18' 6"	11'	15'	—	—
Linsi	.. —	—	14' 8' 5" x 8' 5"	—	—
C. K. Chwang	.. 14' 9"	14' 9"	14' 9"	14' 9"	—
T. C. Chwang	.. 13'	15'	15'	15'	14'

Table showing the Depths of Shafts

Mine	No. 1 Shaft	No. 2 Shaft	No. 3 Shaft	No. 4 Shaft	Pros. Shaft
Tongshan	.. 902.98'	1,661.59'	1,267.64'	—	—
Machiakow	.. 982.58'	334.59'	982.58'	—	—
Linsi	.. —	—	725.49'	593.40'	—
C. K. Chwang	.. 1,126.25'	838.08'	577.86'	837.69'	—
T. C. Chwang	.. 453.00'	453.00'	454.70'	—	240.00'

Methods of Exploitation

The methods of exploitation employed by the K.M.A. in mining the coal deposit of the Kaiping Basin are as follow:



While a coal heading is progressing, raises along the pitch of the floor are cut, 3-ft. by 3-ft. in section, at every 50-ft. interval, to a height of 50-ft., where the first cross-head, 4-ft. by 5-ft. in section, is opened, parallel to the level coal heading, and serves as airway for ventilating the working faces.

After the preliminary developments, the seam is ready for stalls, as shown in Fig. 4, by raising and cross-cutting. If the level above has been worked out, a slab of coal is generally left immediately below the worked-out level as a safety pillar, and the stall working is confined to that portion of the seam under this pillar. If there is no old working above, hand boring is employed in advance of the actual raising for the purpose of determining the conditions above. In this manner, a coal seam between two levels and two bolt holes is divided into blocks, 50-ft. by 50-ft. by the thickness of the seam.

Highly Pitched Seams

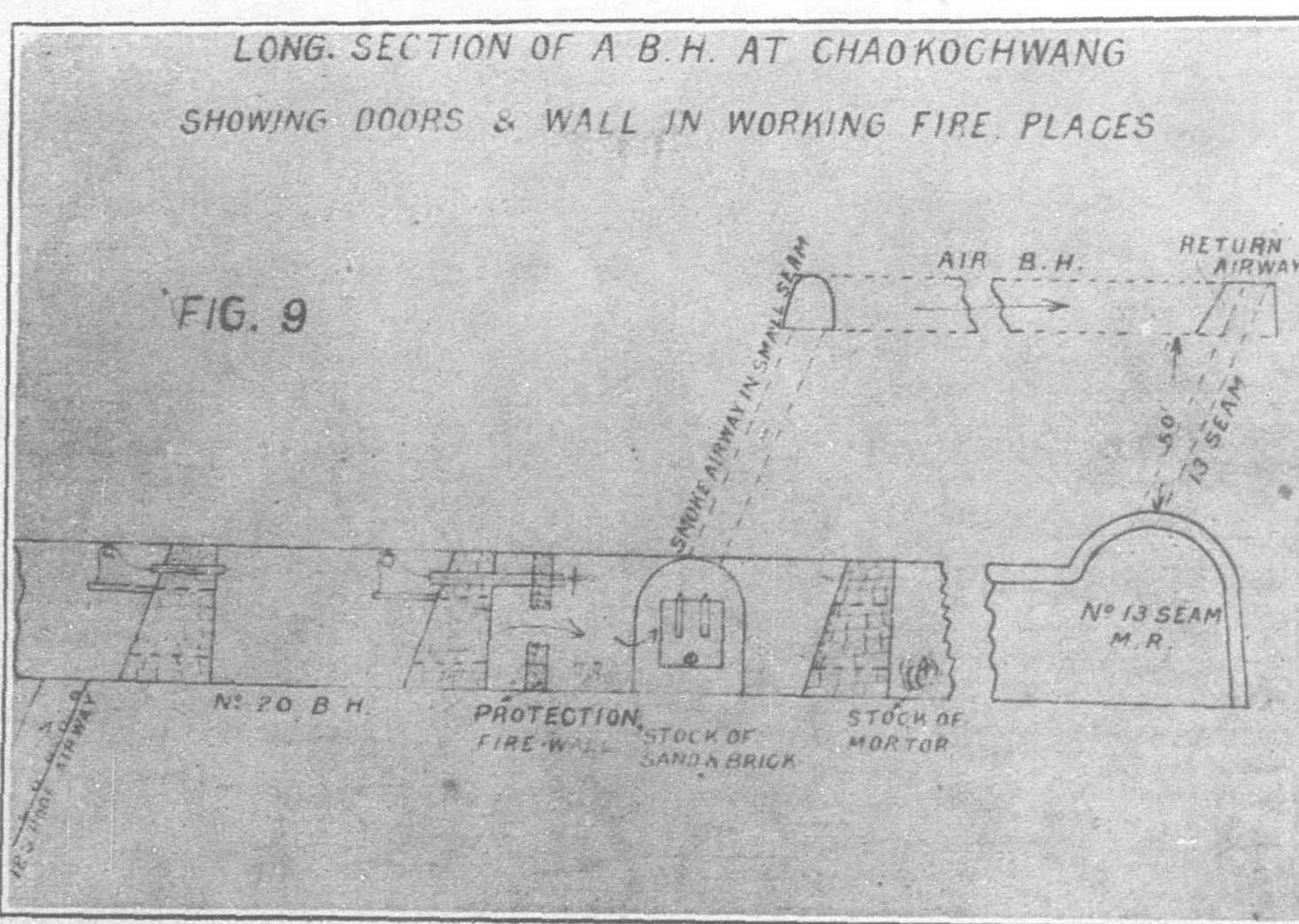
Figure 5 shows the working of a stall on the 4th cross-head between two consecutive raises in a seam 25-ft.—30-ft. thick. First coal bolt holes, 4-ft. by 5-ft., are cut perpendicular to and on the same level with the cross-head at 15-ft. intervals. Between two consecutive coal bolt holes, cross-heads and raises are cut along the roof and floor of the seam, and the raising is stopped at the safety limit. For instance, if the height of mass of coal to be worked is

50-ft. above the 4th cross-head, the raises will be cut only to a height of 15-ft. to 20-ft., where the stall coal bolt holes, and cross-heads are opened parallel to those of the 4th cross-head. After all these have been accomplished, as shown in Fig. 5, the pressure in the coal seam is released by undermining the stall coal bolt holes, the stall cross-heads along the roof and the floor, and also the middle cross-heads. Then the mass of coal will cave down by its own weight.

In actual practice, three or four coal bolt holes are made ready and connected by cross-heads along the roof and floor, before the breaking of the first pillar in the stall. The middle cross-head is only opened when the preceding pillar is entirely worked out. In working thick seams, the middle cross-heads are opened at 10-ft.—15-ft. intervals according to the coal structure.

This method of mining has been largely applied in the mines of the K.M.A. and by using it, the recovery of coal sometimes runs as high as 95 per cent. when the roof and floor are good and strong.

In working thin seams of less than 10-ft. thickness, coal is extracted in much the same



manner as in working the thick seams, only the floor cross-heads are opened at 15-ft.—25-ft. intervals; and while extracting the coal, stulls erected perpendicular to roof and floor are used to keep the stalls open.

For the protection of the bolt holes on the levels above and below, coal pillars of 100-ft.—150-ft. are left; and the return airways in the seam as a rule are cut in the pillar.

Low Pitched and Flat Seams

The general development and the procedures to extract the coal from low pitched or flat seams by the general stall and pillar method are the same as in the first method with the only difference that all the coal is generally sent down to the main haulage level by means of self-acting inclines with small trolleys, and in some cases, as in Machiakow and Tongshan mines, by stagechuting.

"Tailles Montantes" Method of Linsi

This method is adopted for working No. 5 seam on No. 4 east level, of No. 10 B.H. in Linsi colliery, for the purpose of obtaining first grade products from that seam, which in itself contains very good and clean coal. The seam is $2\frac{1}{2}$ -ft. in thickness, with $1\frac{1}{2}$ -ft. shale at the top of the seam. The angle of inclination of the seam is 12-in.—18-in.

Stopes Used

In working this seam by the "Tailles Montantes" method, the general development work is the same as in the method above described. When the coal heading, 6-ft. by 6-ft., has been cut 60-ft., a stope is started. In each stope, there is a self-acting jenny way in the middle. The coal is cut horizontally from the level upward in the direction of the pitch of the seam, as shown in Fig. 6.

The jenny way is cut 6-ft. by 8-ft. in section with $1\frac{1}{2}$ -ft. stone cutting in the sandstone floor. It is supported with 3-piece timber sets at 3-ft. intervals perpendicular to the roof and the floor, and dry packing walls 2-ft. thick are built with the lump packings from floor cutting along the sides of the jenny way with a clearance of 1-ft. between the posts of the jenny way sets and that of the stopes. The loading stations at the top of the jenny way follow always the cutting faces in the stopes, maintaining a room of two sets distance for coal transportation as shown in Fig. 7.

In the stopes, the timber sets consisting of 5-ft. posts, spaced 3-ft. apart, and a split cap of 12-ft. long are fixed at 4-ft. intervals perpendicular to the roof and floor and parallel to the strike of the seam. Between two stopes, there is always a passage, 4-ft. by 2-ft., maintained for manway and ventilation, as the air current is directed to follow the heading on the lever and ascend to the upper level through an airway previously prepared.

Tub Lifts

In mining, the shale at the top of the seam is first removed, and used together with the waste rocks from cutting the jenny way as filling materials for the worked-out portions of the stopes behind. In no case, are the filling materials obtained from elsewhere. When the stopes are waste-filled, leaving a space of 8-ft. by 4-ft. by 25-ft. on either side of the jenny way, the floor is cleaned with a broom, and the packing materials behind the face are covered with planks, the coal is then cut with little effort along the long face of the seam horizontally and upward as far as the new cutting face of the shale above the seam. The coal is transported in baskets which are emptied into coal tubs at the top of the jenny way.

This jenny way is double-tracked, and at the top, about 10-ft. above the stoping faces, a pulley room is provided for hoisting. The pulley is 420 mm. in diameter, portable, and carrying with it a hook and a wooden block brake. It can be hooked on to the post at any point desired. The steel hoisting rope, $\frac{1}{2}$ -in. in diameter and of a precalculated length, is designed such that at one end are attached two chains, one carrying a hook and the other a ring for fastening on the coal tub; and the other end is also looped with two hooks clamped to it at the loop for the same purpose. The loop allows the adjustment of the rope length, when the hoisting distance

is increased as the stopes advance. The empty tubs are hoisted up the jenny way by the gravity pull exerted on the rope of the down-going loaded tubs.

"Tailles Chassantes" Methods of Tongshan

This method of mining has newly been adopted in Tongshan colliery in order to produce coal as clean as possible. It is the most popular method used in Belgium for working the narrow steep dipping seams. No. 10 seam on No. 9 level of Tongshan mine is a narrow seam of excellent quality, with an average thickness of 5-ft.

In this method of working, the preliminary development consists of a coal heading between two bolt holes, an air rise for ventilation, and a packing chute connected to the upper level for sending down filling materials. The coal is cut at sections, starting from the air rise or the main level according to the local conditions, when the first section has advanced over 10-ft.—15-ft. in two directions, the next section above is started, and the first sub-level is filled with waste. In this manner, the upper sections and sub-levels are started consecutively one after another.

Coal Chutes

The coal is worked on ends, the face being advanced in a direction parallel to the strike of the seam. Coal chutes to carry coal to the main level are built in waste. The temporary coal chutes and packing chutes are hooked on the timber-sets, in the empty spaces just worked out. These chutes are made of movable planks.

The timber-sets are made of 3 props, fixed perpendicular to roof and floor with 2 split props 7-ft. by 4-ft. as caps and sills. The sets are continuous in the direction of the dip of the seam, and are 4-ft. apart horizontally. At places where the roof pressure is too great, cribs made of old props and packed with waste are used. The timber-sets are not recovered when the filling is done.

In case the seam is faulted and becomes too narrow to be worked at a profit, that portion of the seam is abandoned, and considered as though it has been worked and filled, and new sections are started at the other side of the fault, as shown in Fig. 8.

Fire Place Method at Chaokochwang Mine

In the 12th seam on the 1st level of Chaokochwang mine, there is fire. When the same seam is worked from the 2nd level, special precautions have been taken to avoid striking the fire. A modification of the present stall and pillar method is used.

Much the same development work is followed, and cross-heads and raises are driven in the same manner as in the first method, with the exception that a coal slab of 10-ft.—17-ft. is always left between two consecutive cross-heads and immediately below the top cross-head to isolate the worked-out stalls from the ones working. The coal masses between the development raises and cross-heads are then penetrated by stall raises terminated at the under face of the coal slab. From these raises, intermediate cross-heads and coal bolt holes are cut to subdivide the coal masses into 15-ft. cubes, and these cross-heads and coal bolt holes are cut downward and inward until the bottom section of the coal mass is reduced to about 3-ft. square.

As the coal is hard and will not cave itself, blockholing with permissive powder is necessary for breaking. This operation is repeated in the extraction of the coal from the slab to the next development cross-head, and from there downward, another slab is retained, and the same processes repeated. The retaining coal slab serves not only as a protective pillar for the old gob fire above, but also helps to retain the fallen roof or floor rocks from contaminating the coal while it is being removed.

Chaokochwang Working

No. 12 seam roof of Chaokochwang mine has a thickness of 17-ft. with a good floor but a bad roof, and is highly pitched. In developing the coal places for stall working, the roof cross-heads are cut some 4-ft. away from the roof for the purposes of maintaining the rigidity of the roof while working the coal.

The coal excavations are supported by 3-piece timber-sets, but as the coal is hard and arches well, the sets are used only at points where pressure is great. Manways and chutes are cribbed or timbered with 3-piece sets.

The coal places and stalls are ventilated by ascending air currents from the inlet airway. The ventilation arrangement for return air from these stalls under fire, on the 1st level, is worth considering. The air, after passing through the 12th seam workings, returns to the 1st level by the roof air raise No. 20 bolt hole.

In going north along the bolt hole, it has to pass through two doors some distance apart, and these doors are hinged on the top. About 2-ft. north of the 2nd door, there is a fire protection wall with a manhole 5-ft. by 3-ft. Bricks, sand and mortar are stocked nearby for closing the opening when fire breaks out. Between each of the two doors and the fire protection wall, there is an iron pipe set inside the brickwork through which an iron rope passes, one end of which passes over a pulley fixed at the top of the bolt hole, and attaches to the door, and the other end is held fast at the north end of the pipe by an iron rod, so by loosening the ropes, the two doors are shut.

The air through the protection wall is deflected by a third door westward into a stone heading cut in a small seam, and by a raise and a stone bolt hole, is led to the general return airway 50-ft. above No. 13 seam mule road.

Fire Walls

At every intersection of the bolt holes with No. 12 seam, fire protecting walls are erected in the seam on both sides of the bolt holes, and the necessary building materials stocked in place. With this arrangement, whenever a fire breaks out in the 12th seam workings, the 1st and 2nd doors can be instantly shut by working on the iron ropes, so the air outlet is blockaded, and the 3rd door is then opened to admit air from No. 13 seam mule road. With the materials ready, the manhole in the protecting walls can be easily closed, and the fire section is thus completely isolated from the rest of the workings.

Fig. 9 is the longitudinal section of No. 20 B.H. west in the Chaokochwang mine, showing the arrangements of doors and fire protecting wall for working fire places.

Sand Flushing at Chaokochwang

This method consists of sending ashes and fine ballast by water under pressure to fill up worked out spaces in a coal seam.

In Chaokochwang colliery, this method of mining was for sometime used in working No. 12 seam roof and floor on the 3rd level for the purpose of maintaining a pillar of such fillings in order to protect the workings below against the gob fires from old places above. The seam is about 50-ft. thick. A room, 7-ft. high by 20-ft. wide by the thickness of the seam, is first cut horizontally from the level upward. Then a mixture of ashes, small pieces of shale, and water is discharged into this room through a 6-in. iron pipe. The quantity of material and water to be discharged into the room is controlled in a mixing plant, 36-ft. below the 1st level. When the flushing is done, and the excess water drained off, the filling furnishes a footstand for cutting the rooms on the top, and a new room is started next to first one.

In the mixing plant, the apparatus consists of a sand pocket with two gates opening into a mixing tank, a discharge pipe, and a water supply pipe. This supply pipe has two branches, one for washing the materials into the mixing tank, and the other directly connected with the main discharge pipe. The water supply comes from a reservoir, of which the dimensions are 6-ft. by 8-ft. by 200-ft. The sand pocket, circular in shape, is built in brick, 36-ft. high and 15-ft. in diameter having a full size screen of 2-in. square holes, 6-ft. below the dampers.

Tangchiachwang No. 5 Seam Method

No. 5 seam of the Tangchiachwang mine is slightly inclined, and consists of two layers, locally called the top and the bottom seams, separated by a barren rock formation, which thickens to the west from nothing to sometimes 4-ft. The bottom seam is excellent in quality, whereas the top seam is generally very poor.

Each coal place is 100-ft. long, with two limiting raises at the ends, and a jenny way along the pitch of the seam in the middle. Cross-heads are opened at 50-ft. intervals along the pitch of the seam, connecting the limiting raises and the jenny ways. The stalls are started from the limiting raises on the topment cross-head retreating toward the jenny way. The timbering in such stalls is the same as in "Tailles Chassantes" method.

The worked-out spaces are filled with the top seam coal, when it is poor, and the intermediate rock pieces. The bottom seam coal, being worked out, is transported in baskets from the cross-heads to the jenny way, where the baskets are put into wooden carriages and sent to a platform below. There they are emptied into a pocket to be loaded into tubs on the level.

Gas Lighting in Hongkong

Suspension Lamps

THE accompanying photograph shows one of the suspension units used for lighting Hongkong. The raising and lowering gear is by the London Electric Firm, of South Croydon.

One of the chief features of the gear is a mechanical support for the lamp. This entirely removes the weight of the lamp from the hoisting rope when the lamp is in its normal position. It is positive in action, and may be said to be infallible in use. The other important point is the gas joint. There is a brass cylinder in



A "Rochester" Lamp, Centrally Suspended, in Hongkong.

the body of the gear which is fixed; and the moving part of the gear carrying the lamp is fitted at the top with a plunger stuffed with greasy asbestos packing with an adjustable nut at the top. The connection between the cylinder and the plunger is so tight that the gears may be tested up to 500-in. of water without leaking.

Whether the gears are used on brackets or span wires, the gas supply tube and the body of the gear are always fixed; no flexible pipes being employed.

The Development of South Sumatra*

By S. A. Reitsma

SUMATRA is a splendid country for the tourist and its importance for the planter and the business man is steadily growing." Thus begins the introductory paragraph of an advertising folder which is being widely distributed by the Netherlands Indies State Railways ; nor is the statement an exaggeration, for

Sumatra has so much of natural beauty that the tourist could spend months there and still find something new every day to enjoy.

It is a cheering sign, therefore, that by the construction of roads, the districts formerly almost inaccessible are being opened and places which a few years ago could be reached only with great difficulty may now be visited with comparative ease and at small expense.

In Central Sumatra, a motor tour from Medan to Padang is as interesting and enjoyable

a trip as one could desire. The combination of a prosperous countryside, imposing scenery and a delightful native population, as seen on a trip from coast to coast never fails to impress the visitor. In a recent number of "Inter-Ocean" there appeared an enthusiastic description of this trip, which equals anything the most blasé world traveller has experienced. The attractiveness of a trip

through Central Sumatra is enhanced by the excellence of the hotel system, the good condition of the roads and last, but not least, the comfortable yet inexpensive motor cars provided by the Government Auto Service.

Somewhat different are conditions in South Sumatra. Here also is wonderful scenery, although much wilder than in Central Sumatra, but the road system is less developed, while the hotels and *pasang-grahans* (government rest-houses) are still rather

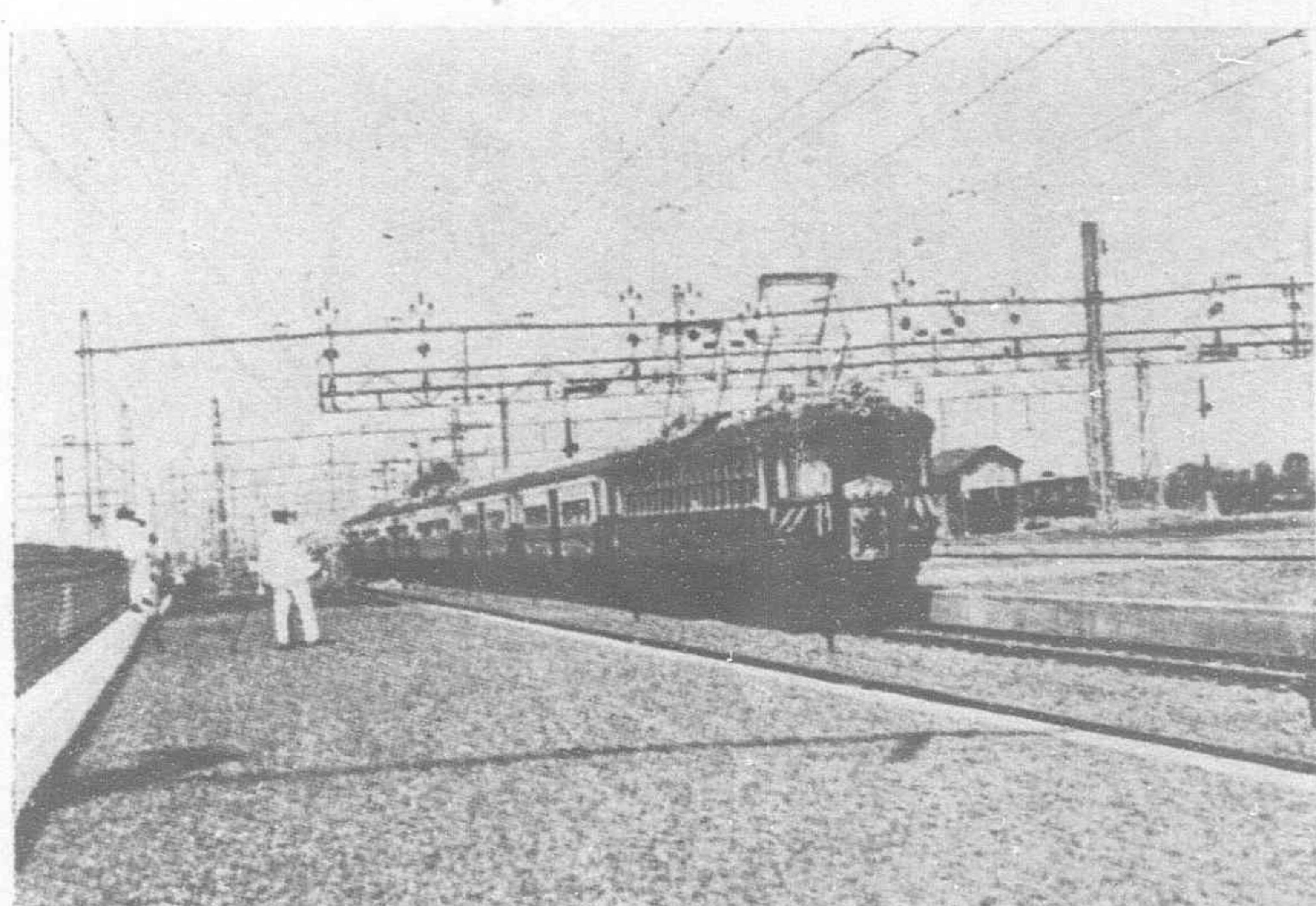


Anai-Kloof-Padang Highlands, Sumatra

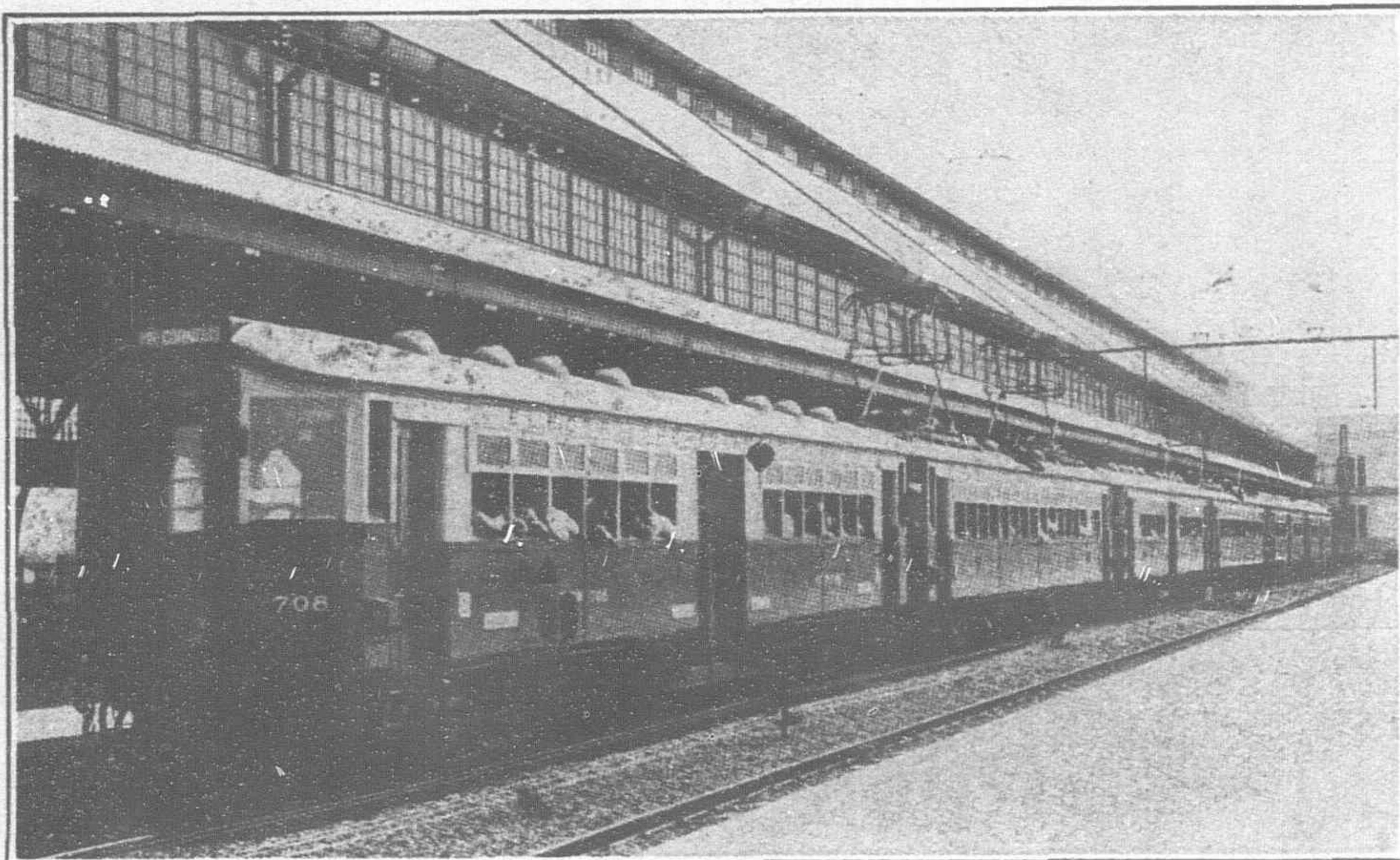
** Inter-Ocean**



The Numerous Waterways of South Sumatra Afforded the Principal Means of Transportation before the Opening of the Railway



The Decorated Electric Passenger Train which Carried the Guests to the Reception Held by the J. G. Railways off to Priok



The First Electric Passenger Train to Leave Weltevreden for Tanjung Priok

primitive. However, an earnest attempt is being made to improve this state of affairs, since extensive tracts have been taken up for European plantations, and the railway is steadily being extended so that within a few years the tourist will have an opportunity, without much trouble or inconvenience, of seeing this attractive country which lies so close to Java and yet has been visited by so comparatively few travellers.

Until recently South Sumatra had no railways whatever—of what use would a modern transportation system have been in this extensive wilderness? At the beginning of the present century, however, it was decided to investigate conditions more carefully and after a preliminary survey in 1903, Chief Engineer Richter of the State Railways was instructed to submit a detailed report upon the possibilities of railway construction in this district. Eight years later, in 1911, the order was given for building a line from Moeara Emin to Palembang, with a branch to Telok Betong, in the Lampongs, and early in the following year Chief Engineer van der Waerden began the actual construction, working from two points, Telok Betong (Oosthaven) and Palembang. Enormous difficulties were encountered. In these wild and at that time inhospitable regions, consisting mostly of unhealthy and impenetrable swamps, there was no labor to be found and when, after much trouble and expense, construction gangs were brought from Java, the natives sooner or later became ill or deserted. It was only after many disappointments and the establishment of a private labor recruiting system, together, with an excellent but very expensive health department, that the State Railways' engineers succeeded in completing the first section of line—Pandjang (Oosthaven) to Tandjong Karang, in the Lampong district, a distance of 12 kilometers—which was opened for traffic on August 3, 1914.

On November 1 of the following year an additional 27 kilometers of the line, reaching Tegineneng, were brought into service, while on the same date the 78-kilometer stretch from Palembang (Kertapati) to Prabemoeli was opened. Thereafter, the progress of the work was retarded, for when the Great War broke out it became almost impossible to obtain materials, while later the mania for economizing threatened to stop the work entirely. Nevertheless, additional sections were completed from time to time, including two branch lines—to Telok Betong and to the Boekit Asem coal mines—and an extension from Moeara Enim to Lahat. On the main line between Lampong Bay and Palembang there was still lacking at the beginning of 1927 the 70-kilometer division from Negararatos to Martapoera, which was due to be completed by February 22. The work was finished on scheduled time and when the last

rail was laid on this section the whole line was completed and ready for traffic. In view of its great significance, it was fitting that this event should be marked by ceremonies and celebrated in festive style.

To assist at the formal opening of the line, W. F. Staargaard, Chief Manager of the State Railways, sailed on February 21 from Tandjong Priok for Telok Betong, accompanied by a large number of guests, including the Director of Finances, the heads of the Departments of the Interior, Education, Agriculture, and Government Enterprises, the Chairman of the People's Council, several members of the Council, representatives of commerce and shipping, railway officials and others. A number of ladies were included in the party as well as journalists and photographers.

The K.P.M. steamer *Van Overstraten* was especially chartered for the trip and after a pleasant voyage through the Straits of Soenda, Palembang was reached at daybreak. In a special train, decorated for the occasion, the trip to Blambangan Oempoe began, after a hundred guests from the Lampongs had joined the

visitors from Java. At Blambangan Oempoe, a station in the jungle, inaccessible to motor cars, the special train from Palembang was met, and after greetings were exchanged the party adjourned to a big shed where the Batavia caterer Versteegh served lunch.

In an excellent speech, Mr. Staargaard outlined the significance of this mighty work of civilization which Mrs. Staargaard was about to inaugurate by fastening a silver bolt into the connecting rails, which had been painted in the national colors. The Director of Government Enterprises also spoke, as did the Residents of Palembang and the Lampongs, the latter addressing a part of his speech in Malay to the native chiefs present. Other speakers included the Chairman of the People's Council, the Director of the Department of Agriculture and Mr. Onnen, who spoke on behalf of the association of private railway and tram line companies.

After an interval, the return trip was started and the party from Java reached Tandjong Priok at daylight on February 24. The writer travelled straight through to Palembang with Mr. van Zalinge, President-Director of the K. P. M. and Mr. Brand, a Director of the same company, just out from Holland. We were the first passengers to complete the trip from Oosthaven to Palembang on a through train.

The completed line, 528 kilometers in length and built at a cost of about f 58,000,000, will contribute greatly to the development of South Sumatra. A remarkable feature is that already the project is practically on a paying basis, thanks to the rapid develop-



Tropical Jungle Land in the Padang Highlands with Modern Steel Railway Bridge in the Background

ment of the country and to the freight revenue derived from the transportation of coal from Lematang. This auspicious start offers encouragement for the extension of the system and plans are already being formulated for an additional line from Lahat over Tebing Tinggi to Loeboek Linggau on the highway connecting Moeara Bliti and Bengkoelen, a distance of about 120 kilometers.

As mentioned by several of the speakers at the inauguration ceremony, Sumatra is decidedly the land of the future; it needs only better means of communication and an increased population to achieve full development. The first steps have been taken and progress from now on is expected to be rapid.

When the hotel system has been developed, the way will be smoothed for tourists and this land of mighty rivers, imposing

mountains and lovely lakes and waterfalls will take its due place in the world of travel. Delightful excursions such as those to Lake Ranau and Kroëor, to Moeara Aman, Lake Tes, Tjoeroep and Benkoelen, or from Lahat through the four ravines of Poeloe Pinang, Edikat, Lematang and Selangis to Pangger Alam and the Dempo, will then become familiar to travellers and the charm of these regions will become known outside of the relatively small circle of those who have traversed these routes before and found adequate compensation for whatever inconveniences the journey may have involved.

South Sumatra is also of vast interest to the planter, due to the development of coffee, rubber, pepper and oil-palm plantations. It is indeed the land of the future and with rapid strides it is travelling the road of progress.

The Motor Boat in China*

British Engines to the Fore. Business Restricted by Internal Troubles

BUSINESS in China at the present time is at a somewhat low ebb, but visits to the various boat-yards in Shanghai recently gave the writer a slight impression of the possibilities of the motor boat if the country were in a settled state. The first yard visited was that of the New Engineering and Shipbuilding Co., a firm chiefly concerned with the construction of large steam vessels, but which has a very well-equipped motor shop, where the repairs for the largest Diesel engines of motor ships visiting Shanghai can be undertaken.

One of the boats on which work was proceeding was a motor barge belonging to the A.P.C. and capable of carrying 65 tons of kerosene. It was originally equipped with a 60 h.p. Kromhout paraffin engine, but this has been removed and a Kromhout two-cylinder oil engine of 60 b.h.p. installed. For driving the air compressor and pumping out the cargo an 11½ h.p. Gardner semi-Diesel single-cylinder engine has been fitted, driving through clutches.

What appeared to be unusual types of craft were two new barges being built for the Anglo-Persian Co. to carry petrol. As they have such a highly inflammable cargo they are not allowed to carry any light or electrical equipment aboard. For pumping, therefore, a 6 b.h.p. Campbell cold-starting horizontal oil engine is fitted, coupled through a clutch to a Ram pump, and this unit is duplicated. The arrangement is novel, but appears to be highly satisfactory.

The *Kwan Su*, a harbor launch, is having its old Gardner paraffin engine removed, as this had been running since 1911. The new installation will consist of two 48 b.h.p. Gardner semi-Diesel engines with electric starters and a compressor driven by a 1½ h.p. Gardner engine. The boat is 66-ft. long with a beam of 11-ft. and a draught of 2-ft. 6-ins., and with the new engines a speed of 10 knots is anticipated.

At the same yard two fuel-oil barges, owned by the Standard Oil Co., of New York, were having their four-cylinder 120 b.h.p. Beardmore semi-Diesel engines overhauled, and an interesting piece of work was being carried out on a large new steamer for the Ichang-Chungking service. Electric power is fitted on this vessel by a 9 kw. dynamo driven by a Gardner semi-Diesel engine. The reason for the employment of an oil engine on a steamer was that it is only required to run the generator at night, and it is

cheaper to use a separate oil engine rather than keep up steam for the purpose.

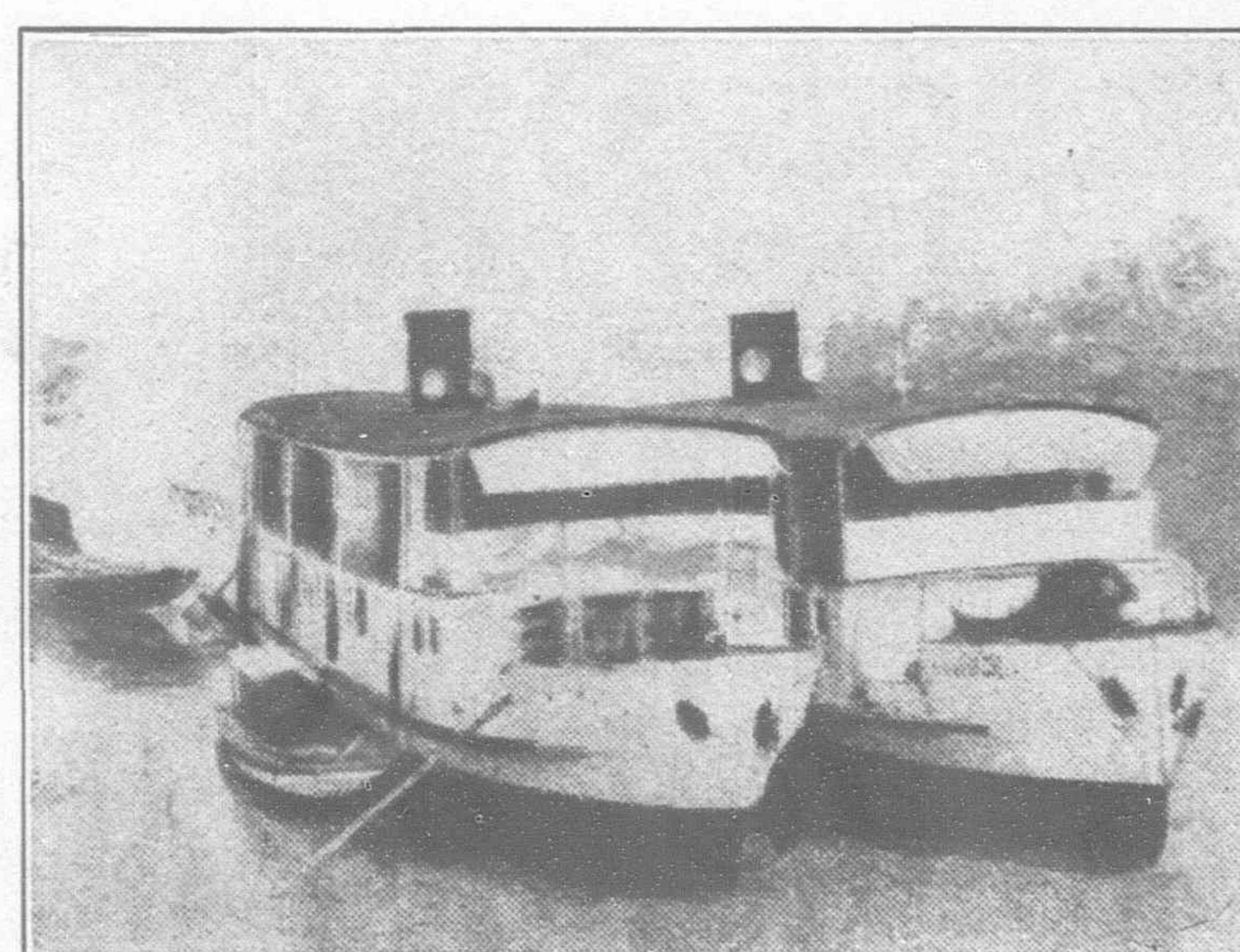
A visit was paid to the yard of the Shanghai Dock and Engineering Co. A remarkable ship is under construction here for Japanese owners for the Ichang-Chungking service. It is 136-ft. long, with a beam of 24-ft. and a draught of 4-ft. 9-ins. She is to maintain 12½ knots. Two 300 b.h.p. Gardner semi-Diesel engines with the latest type of electric starting and governing control, as recently described in "The Motor Boat," are to be fitted.

The writer was assured that this is the first vessel of the type to be fitted with semi-Diesel engines for this particularly dangerous part of the Yangtze. It is also of special interest that at the present time a British make of engine should be selected, as numerous Continental manufacturers quoted for the order. A 2 kw. dynamo, driven by a Gardner single-cylinder paraffin engine, also operates a separate compressor. Continuing up-river, the writer came to the yard of the Jardine Engineering Co., which devotes its attention wholly to motor boats, and which has a really well-equipped yard and workshop. Owing to the troublous times comparatively little work was in hand, but there were numerous Gleniffer engines in the shops, and we were assured by the manager that so soon as matters had settled down it is anticipated that work would proceed rapidly, as they had numerous orders awaiting confirmation.

The final visit was paid to the yard of the Kiangnan Dock and Engineering Co., which, although Chinese owned, is entirely supervised by foreigners. Here, again, there was little work on hand, more particularly as craft would probably be commandeered.

A big vessel was, however, under construction for Chinese owners, to be used on part of the Yangtze River above Chungking. Two 96 h.p. Gardner semi-Diesel engines are to be installed. The vessel is 80-ft. overall, with a beam of 15-ft. and a draught of 2-ft. 8-ins., and a speed of 10½ knots is anticipated. This yard has no other motor work in hand, apart from fitting a 3 kw. Gardner oil-engined lighting set in a new steam tug for the Anglo-Persian Co. and a similar unit on another steam tug for the Chinese Customs authorities.

These few visits clearly show the supremacy of British-built engines, as there was only a single engine being installed that was not British.



Two Large British-engined Motor Passenger Boats at Hongkong

*"The Motor Boat."

Shanghai Meter Testing Laboratory

By E. Jacobs, Assistant Meter and Testing Engineer

THE Shanghai municipal electricity undertaking, having a capacity of 120,000 kw. and nearly 50,000 consumers, necessarily has a fairly large meter section, more so as its remote position with respect to manufacturers makes it essential for extensive repairs to be carried out by the undertaking. This department, which employs ten foreigners and 120 Chinese, is accommodated in a 4-storey building, a part of the original generating-station premises. The ground floor is devoted to the meter stores and the issue and return of meters and instruments, the second floor to the main testing laboratories and the third and fourth floors to the offices and workshop and the meter engineer's laboratory.

Fig. 1 shows the issue and return room. It can no doubt be claimed that the meter stores is one of the largest kept by any electricity supply authority. It will house some 4,000 new meters, in addition to the old ones, in six main bays; these bays are sub-divided into a total of 68 sectional bays. The old meters are kept in maximum circulation, the new ones being drawn upon as little as possible; in fact, new stock is looked upon as representing the manufacturers. Four sections accommodate: new meters; tested meters; meters from service; and meters from workshop. By keeping the last two sections down to a minimum it is possible to ensure that the old meters are ready for service with little delay. Suitable stock cards show the internal movements of meters, which are governed by a "flow sheet." In addition to the main sec-

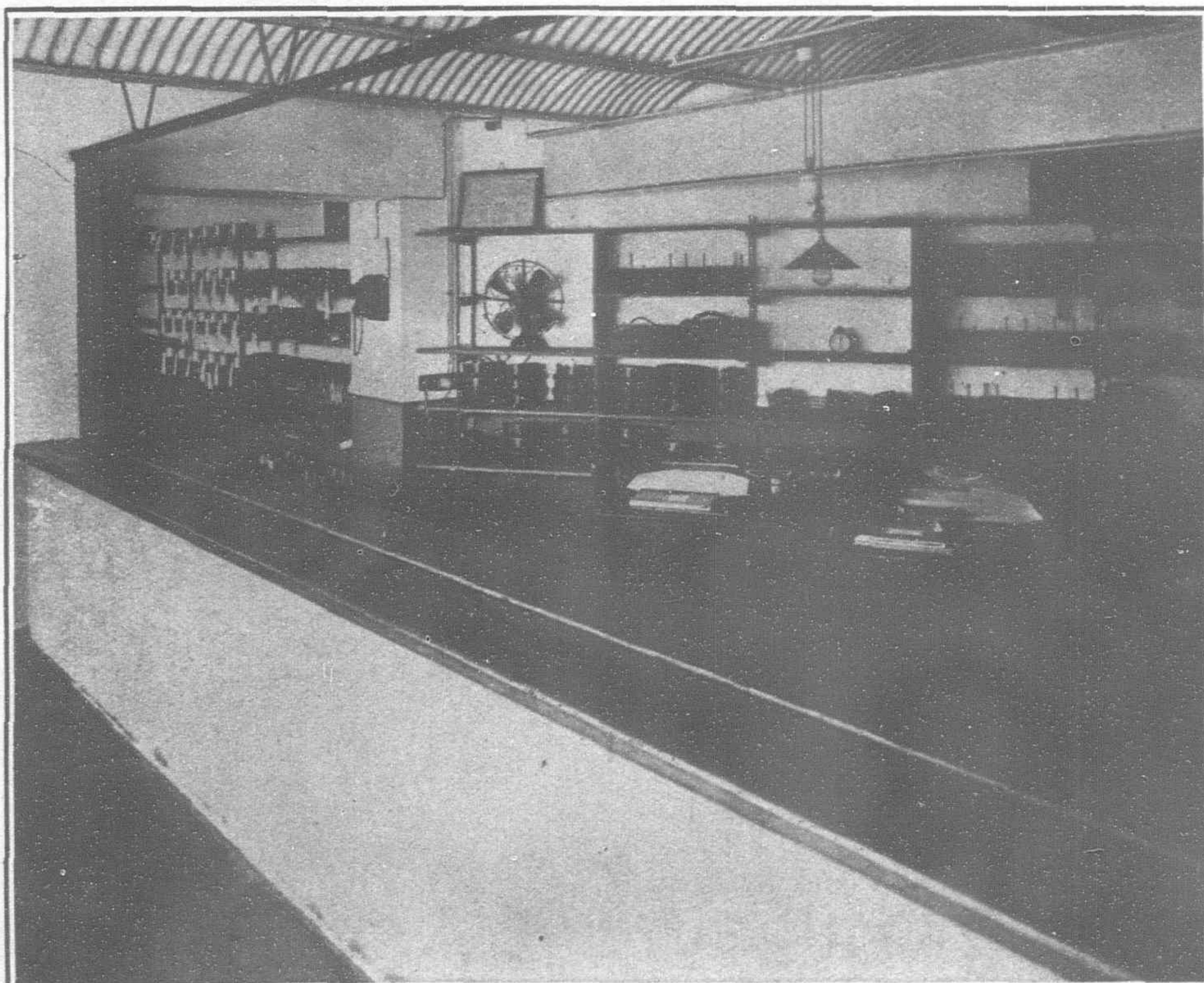
tions are the "hospital," where meters waiting for new parts not in stock are kept, and "scrap bays," where obsolete meters are broken up at regular intervals.

One of the testing laboratories is devoted to a.c. meter testing, and is staffed by fifteen native meter testers under foreign supervision. Fig. 2 shows a general view of this room. The center racks take care of single-phase meters of up to 100-A capacity. The electrical tests are made against rotating sub-standards and service meter sub-standards are used for checking tests. L.p.

current is used for testing, the supply transformers being so arranged that the various loads required for each complete row of 16 meters are obtainable by means of a selector switch only. A variable resistance is used to adjust the load when less than the full number of meters are under test. These racks have a monthly output of 2,000 meters. "Whole-current" type single-phase meters of over 100-A capacity and 3-phase meters are tested on the wall racks. Fig. 3 shows one of the racks used for testing whole-current 3-phase meters.

A phase shifter is installed for the 3-phase testing, suitable switching arrangements being provided for its use in conjunction with the various benches. Most of the test-room gear has been made and assembled by the meter department; Fig. 4, which illustrates one of the 3-phase transformer meter testing benches, indicates the class of work that can be turned out by Chinese mechanics.

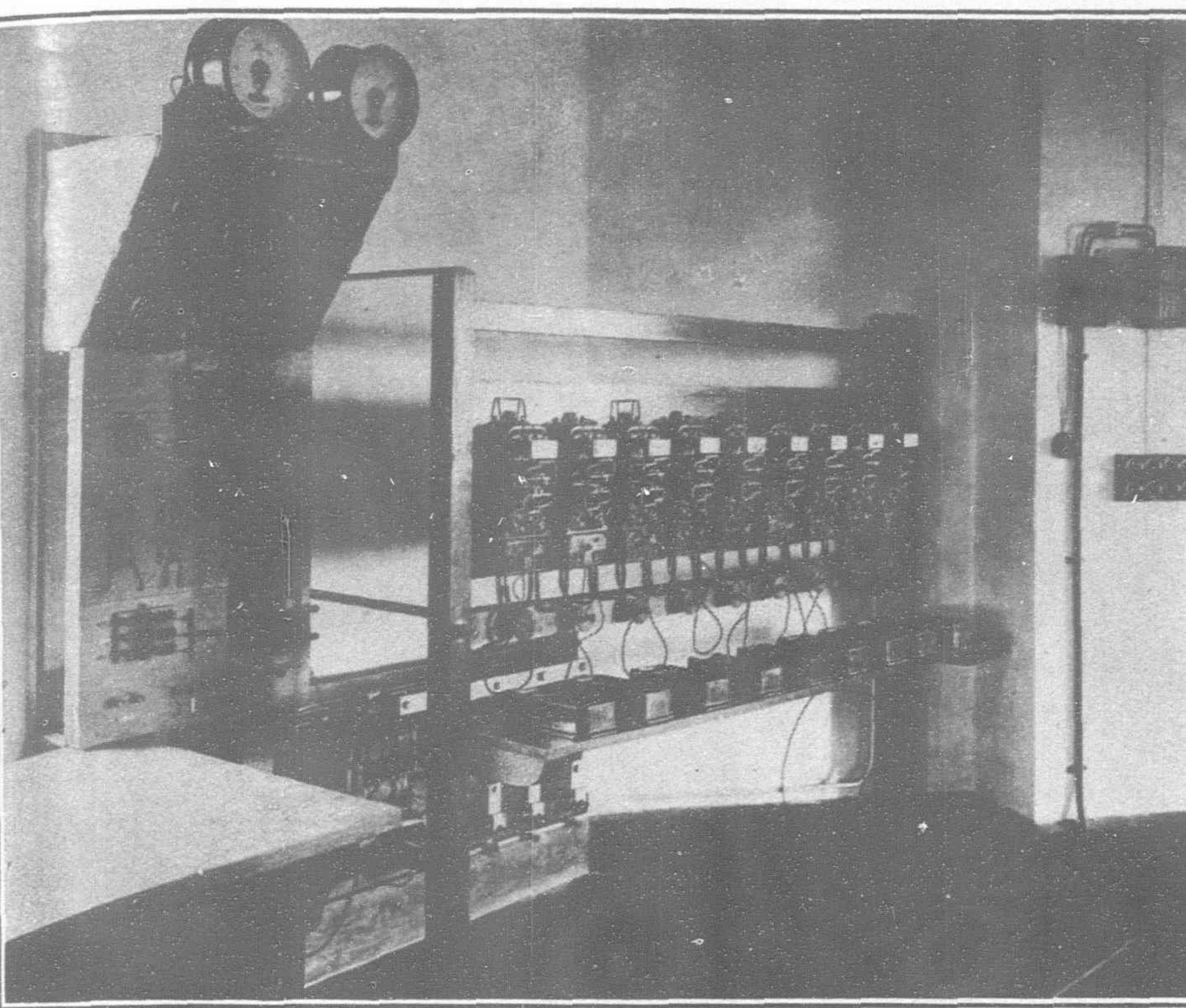
Alterations and additions are still being made in order to cope with the increasing amount of



Issue and Return Room



4. C. Testing Laboratory



Whole Current 3 Phase Testing Rack

work to be handled, and much has been done to simplify the testing. To avoid the use of multi-range, and various ranges of standards, current transformers with 5-A secondaries are used for all the heavy-current testing. These transformers are carefully selected and tested for phase-angle and ratio errors with their correct secondary loadings, so that corrections can be made when necessary.

A separate laboratory is devoted mainly to d.c. testing, but is also equipped for a.c. single-phase work to relieve the instrument-testing laboratory. It is fitted with three motor-generator sets for supplying varying pressures and loadings up to 650 V and 2,500 A respectively.

In addition to the d.c. meters, all the d.c. instruments and relays for the various protective systems in the generating station and sub-stations are tested and calibrated in this laboratory. Leading off from this section is the potentiometer and photometer room, where all the testing instruments are standardised. Standards and special instruments bought from manufacturers either in England or America, no matter how carefully packed, cannot always be relied upon to give the actual curve obtained at either the N.P.L. or Bureau of Standards, so that the potentiometer is a very necessary and closely guarded piece of apparatus, and only used by members of the foreign staff. The photometer is used chiefly on street-lighting lamps, and for tests on new or special lamps. This room is also used for the development of oscillograph records.

The instrument-testing laboratory is equipped for the testing of a.c. instruments. Current transformers are tested by means of a Silsby testing set for phase-angle and ratio. Fig. 5 shows the current-transformer testing rack with the Silsby apparatus on the right. The standard current transformers used in conjunction with this set are permanently mounted and arranged so that they can be easily connected in circuit with the transformer under test. A loading transformer supplies 1.p. current up to 2,400 A. A similar set for potential-transformer testing has been obtained and will soon be in operation. In this section

of the department, during 1925, 402 instruments were re-scaled, 1,326 tested, and 752 repaired and cleaned.

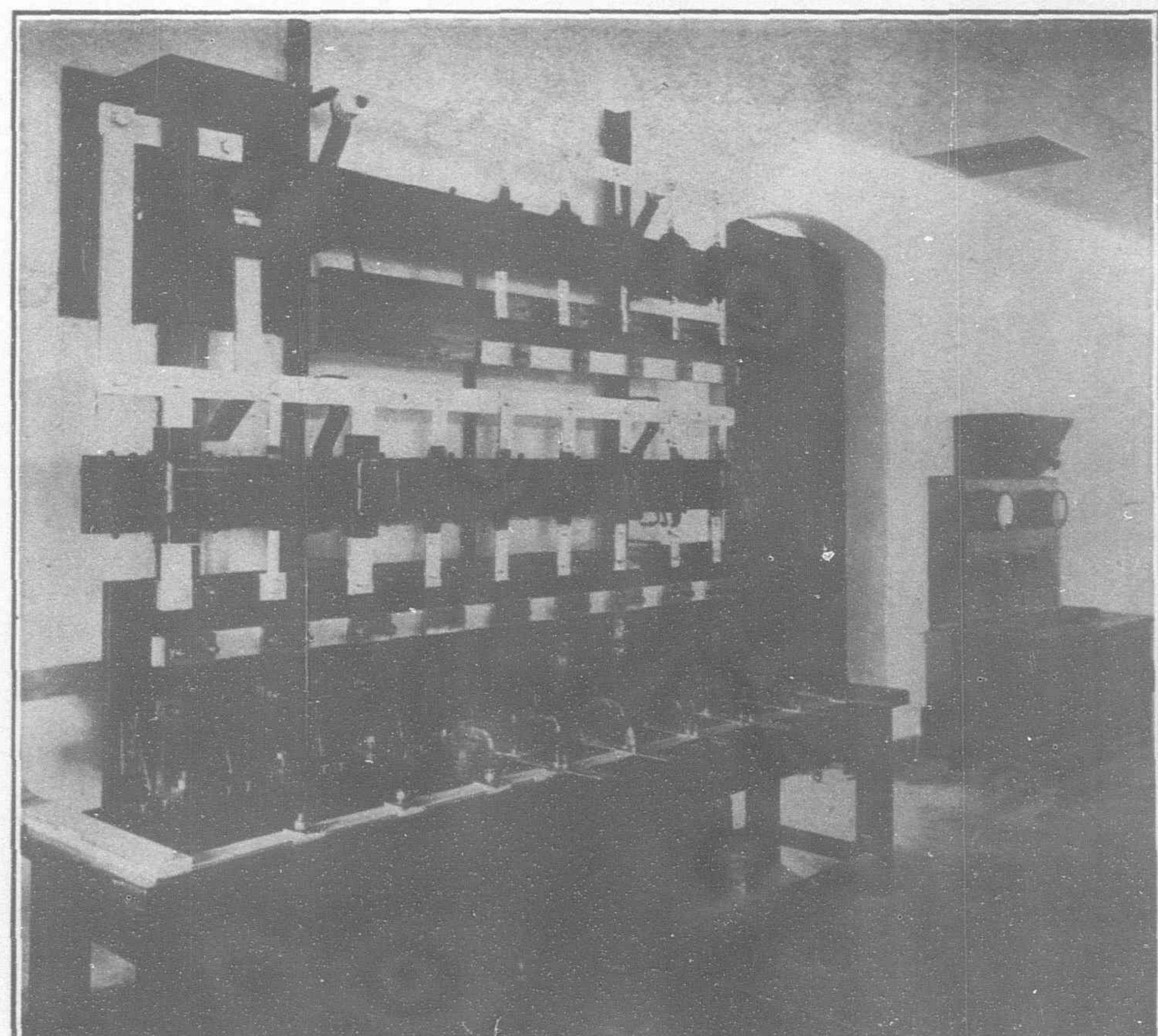
The main workshop finds employment for forty Chinese workmen, including three watchmakers. In addition to the routine work of cleaning meters and instruments, special men are kept on the manufacture of testing switch-gear and other apparatus.

A variety of instruments is made in this section for the other departments of the undertaking, including current transformers, portable milliamperemeter and millivolt-type instruments and polarity-testing sets. The wiring of service meter boards is another part of the routine work, and also the assembling of the cut-outs used for the 3-phase standard metering.

The outdoor staff consists of four foreigners and twenty-five Chinese meter fixers. The fixing and removing of single-phase meters and fuses is carried out by the Chinese meter fixers under the supervision of a foreigner. The distance from one end of the system to the other is approximately fifteen miles, and specially-designed light trucks are used to facilitate the dispatch of men and meters. Each truck is designed to carry forty-meters (with a minimum vibration) and the necessary men, and other apparatus. Each meter fixer is supplied with an indicator for distinguishing between phase and neutral, so that the series coil of the meter can be connected in the phase wire.

The routine testing of the meters is based on a three-years' change, and has until recently been carried out by taking one type and size at a time. A new card index which has been prepared will enable the streets to be taken in rotation, and the whole of the meters changed; this should speed up this branch of the work. The investigation of complaints is a full-time job for a foreign meter inspector, provided with a car and a senior Chinese assistant. The complaints are settled with as little movement of the meters as

(Continued on page 473).



Transformer Testing Apparatus

Selling American Machinery in the Dutch East Indies*

By A. W. Prins, Export Manager, the Novo Engine Co., Lansing, Michigan

FEW American machinery manufacturers have ever made a strenuous effort to create a market for their products in the Dutch East Indies, and as a result few are adequately represented. With the exception of certain lines such as automobiles and accessories, typewriters, sewing machines, etc., ninety per cent. of the machinery offered for sale is of European manufacture, and although this is in the first place due to the naturally close relations with the Netherlands, and therefore with Europe as a whole, it is nevertheless true that a large number of American firms either do not realize the importance of this market or do not know how to reach it.

There are in general three ways in which export business may be done: by mail, through branch houses, or through local agents. The first method is out of the question and the second is too expensive. The third will show to be very effective provided a well-established, reliable agent is appointed with an active sales organization, and the difficulty remains in finding such a firm.

If the American manufacturer sends one of his sales engineers out to investigate the territory and appoint an agent, it not only is going to add a considerable amount to his expense budget, but it will be found that the right kind of connections cannot be made since agency agreements and distributors' contracts are not made by the local office in the Dutch East Indies but by the main office in Holland in nine cases out of ten.

The solution of the problem is to appoint a Dutch house in Holland to act as the manufacturers' agent as well in Holland as in the Dutch East Indies. When doing so, great care has to be taken however, to select a firm who is really active in both countries, since there are too many Dutch concerns who sell machinery in Holland and consider the "colonial business" as a side line, without having the proper organization to take care of this highly specialized business, while on the other hand there are as many who cover the Dutch East Indies but neglect the home market on account of too much competition or other reasons.

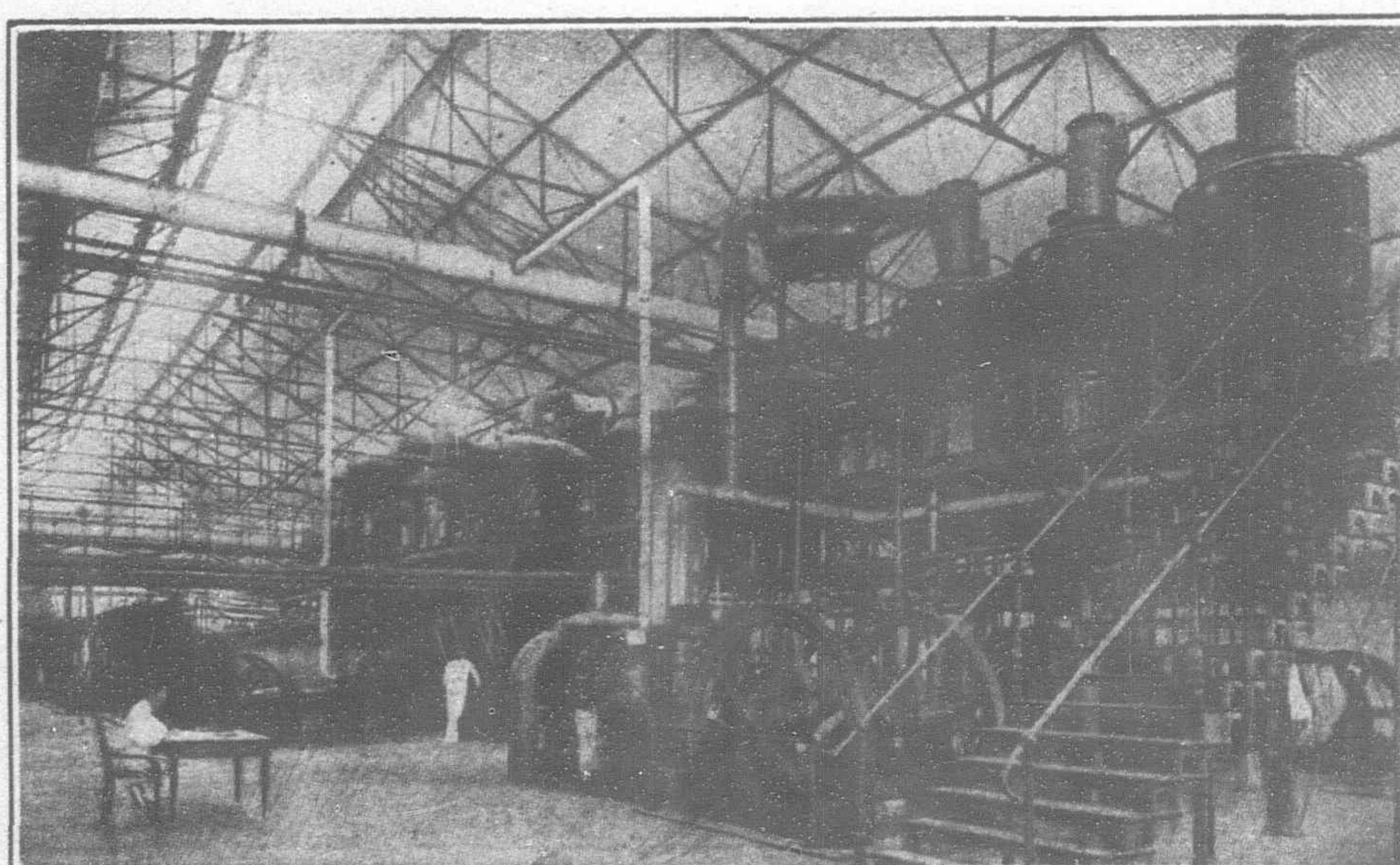
The reason why it is preferable to have one company handle both countries lies in the close relation existing between the home office and the colonial offices of practically all companies that purchase for or in the Dutch East Indies. The largest class of machinery users are perhaps the sugar mills and practically everyone of these has its main office in Holland. Since prices in the Dutch East Indies are higher, due to the higher selling expense, many companies will do their purchasing in Holland unless the material may be purchased from stock for immediate delivery in the Dutch East Indies. This also has been more or less the policy of the Dutch East Indian government who purchase small machinery through the "Central Inkoopkantoor" (Central Purchasing Office) at Bandoeng, Java, and large machinery through the "Department van Kolonien" (Department of Colonies) at The Hague, Holland. In many cases the real selling must be done to the local engineer in the field or on the estate while the actual purchase order may come

in through the office in Holland and this shows the importance of close co-operation between the dealers' offices in Holland and in the Dutch East Indies. The fact that this does not always exist has led to many disagreeable conflicts.

Java, the most important island of the group, is a much more important market to Holland than may be realized. There are Dutch manufacturers who have designed their products to particularly suit the colonial market such as one of the largest pump manufacturers who calls his special sugar house pumps "Java Pompen" (Java pumps). Others maintain offices in Java with competent engineers informing their home offices of any new market requirements. It shows the importance of the Dutch East Indies as a machinery market, one that is hardly touched by the American manufacturer. Not because of any preferential tariff, not because the American products are not suitable, but simply because they are not known, and what is unknown is not wanted, which is specially true in this market since the Hollander is very reluctant in changing the type of machinery he has been buying and to which his Javanese mechanics have become used.

The type of machinery required is in the first place sugar house equipment. There are over 180 mills operating in Java with a total capacity of over two million tons of cane per year. The kinds of products turned out range from molasses to superior sugar and the processes in use are defecation, sulfitation and carbonization. The milling season lasts from May to October and machinery is ordered for delivery in March or April. With one exception the mills are of smaller capacity than the average mill in Cuba, ranging from 370 to 1,200 tons of cane per day, resulting in smaller machinery being used. The kind of native labor available is of the cheapest kind so that the least complicated type of machinery is preferred while labor saving apparatus is of little value. Electrification is gradually being introduced and it is an interesting fact that the motors for the first electrically driven mills were furnished last year by an American firm in spite of severe competition from German and Dutch manufacturers.

There are a large number of rice mills, coffee, tea, tobacco and rubber estates, vegetable oil mills, tap oca plants, alcohol distilleries and a quinine factory, the latter being controlled by the government, all requiring machinery. There are furthermore two large oil companies operating in the Dutch East Indies, the "Bataafsche Petroleum Maatschappy," producing company of the Royal Dutch-Shell combination, with refineries in Java, Borneo and Sumatra, and the "Nederlandse Koloniale Petroleum Maatschappy," a subsidiary of the Standard Oil Company of New Jersey, owning refineries in Java and Sumatra. Both companies purchase almost entirely through their purchasing offices in Holland and the United States. Other manufacturing industries are the salt and the opium industries, both in the hands of the government, and smaller plants for the manufacture of ice, soda water, cigarettes,



Interior of a Sugar Factory in Java

paper, paint, soap, etc. There is also a certain amount of mining, of which tin is the most important, found on the islands of Banka and Billiton, which industry is also controlled by the government.

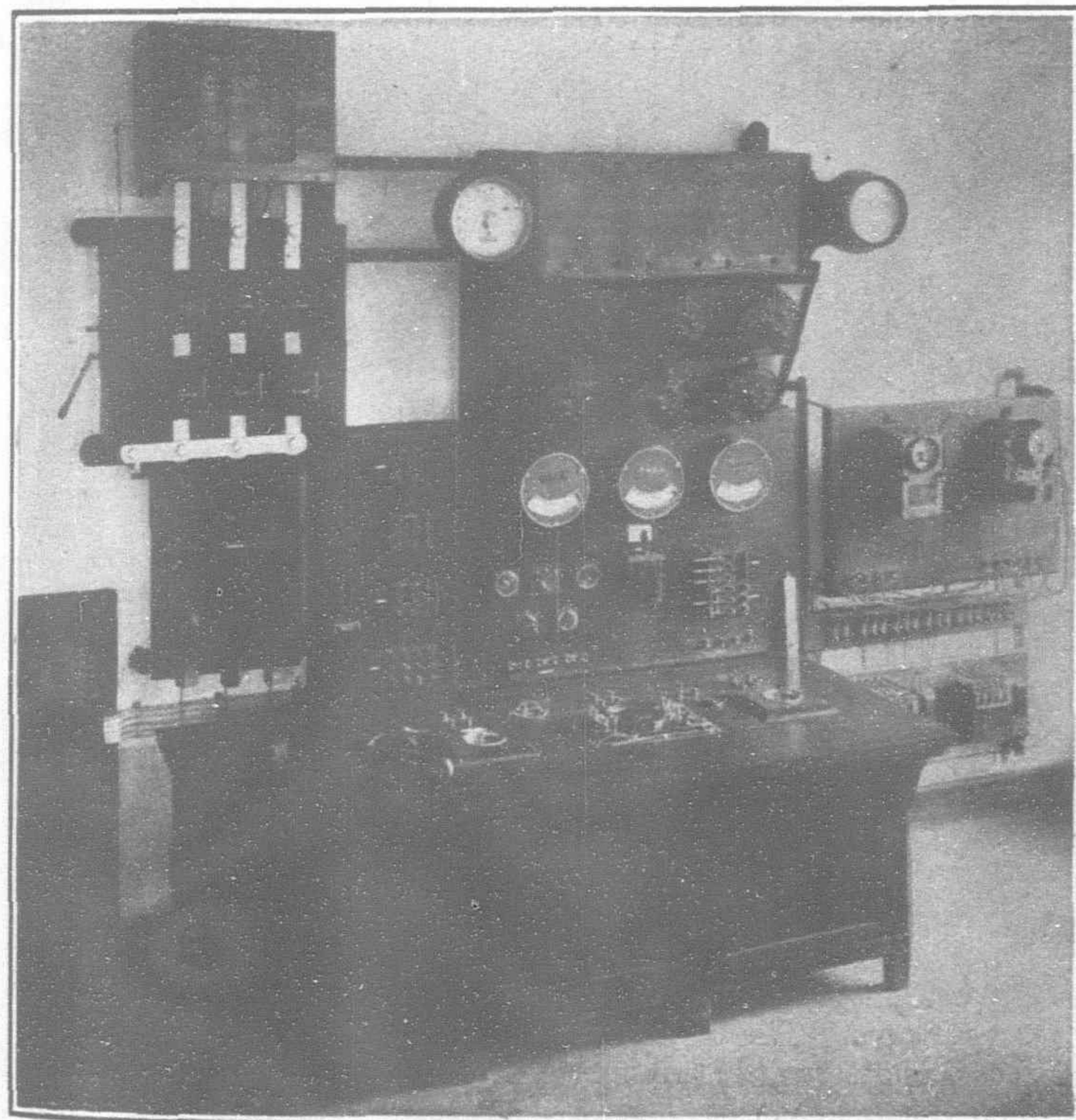
As a market for American machinery the Dutch East Indies should not be overlooked, but it is one that requires special attention. On account of its long distance away from machinery manufacturing countries a sufficient amount of machinery should be kept in stock by the local representative, and this, combined with the high travelling expenses in this large and difficult territory, makes it essential to choose an agent with sufficient capital and a sufficiently large sales force. A firm with merely one small office in one of the cities in Java cannot possibly do justice to the entire Dutch East Indian market.

Shanghai Meter Testing Laboratory

(Continued from page 471).

possible, and reparis carried out *in situ* in the cases of meters which have stopped, defective dials, and meters requiring cleaning. In cases of suggested or suspected over registration, the meter is tested *in situ* against a rotating standard, with either the consumer's load or by means of portable loading sets.

Maximum-demand-meter work is an important part of the activities of the outdoor staff. The department has approximately 100 consumers on m.d. charges, mostly cotton and flour mills. Eight mills have demands of 2,000 kw. and over, and each consumes more than 1,000,000 kwh. per month. It is load of this sort of course that gives Shanghai such a remarkable load factor, which is



Transformer—Meter Bench

in the region of 50 per cent. A power factor of 70 is assumed as a rough guide for the correct registration of the mill meters. If the actual load figure falls very much below this figure, an investigation is made as to the working of the mill during the month, and if considered necessary, special tests are made on the meters.

The tester in charge of the readings of these meters is provided with a load-factor calculator, from which he is able to read off at a glance the l.f. for the month from the meter readings and demands.

Each consumer on the m.d. basis is charged on the readings of two meters, each with its own current transformers and, in the case of h.p. metering, its own potential transformers. Consumers of

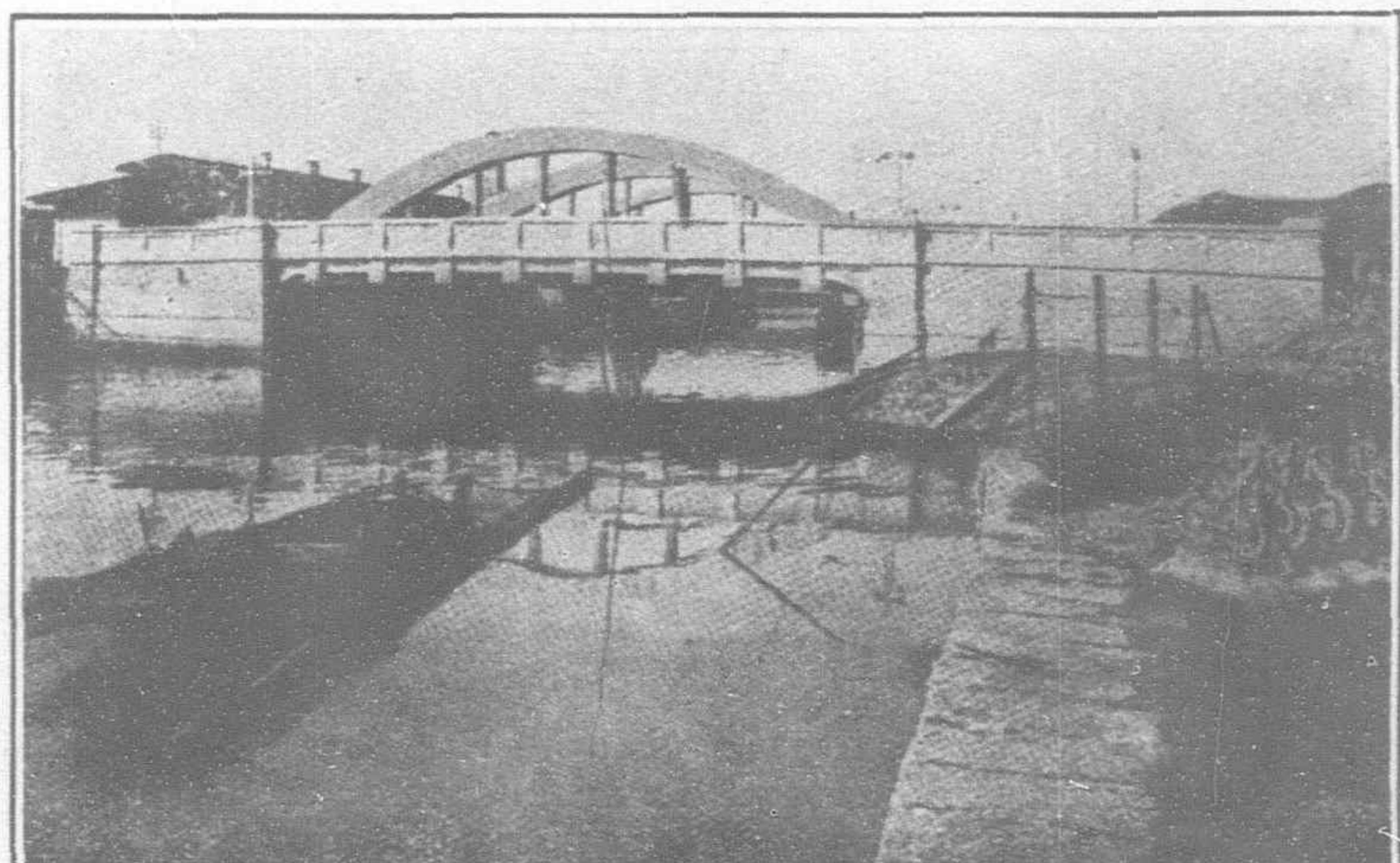
over 2,000 kw. have three such meters. Standard meter boards have been adapted for both h.p. and l.p. metering, although in most cases h.p. meters are fixed on the sheet-iron front of the cubicle containing the meter transformers. Line diagrams are kept of all the large meter installations, and these prove of great use in settling quickly any queries which arise as to the position and function of a particular meter.

Monthly tests are made on the watt-hour meters of the generators, interconnectors and station transformers at the generating station; these meters are fitted with testing links which allow standard meters to be connected to the front of the panel whilst the machine is on load. The meter department also takes care of the electrical side of the efficiency tests during the acceptance trials of new plant, and check tests on old and reconditioned machines.

The writer's thanks are due to the engineer-in-chief and manager, Mr. T. H. U. Aldridge, M.I.E.E., for permission to take and use the photographs from which the accompanying illustrations have been reproduced.

The Crawford Bridge in Singapore

THE Year 1926 in Singapore opened with the Crawford Street cofferdam complete but flooded, and the Lavender Street cofferdam in process of construction. After driving additional sheet piles, the leak in the Crawford Street cofferdam was sealed and a large proportion of the timbering renewed, and the completion of the foundation and building of abutment proceeded without special incident. The Lavender Street cofferdam when completed gave no trouble, but very serious trouble developed when excavation commenced. It would appear that the cutting of the blue clay released a considerable volume of Carbon Monoxide, or of some other gas of similar properties. Excavators collapsed after two or three hours' work, and almost everyone who stayed in the cofferdam more than half-an-hour was affected with sickness in one way or



The Crawford Bridge

another. Several men died and others suffered from prolonged illness. High power fans were rigged up in an attempt to disperse the gases but without much effect, and it became necessary to pay high wages to excavators and allow them to remain only a short time in the Cofferdam.

On 28th June an earthquake tremor shook the earth bank behind the Lavender Street abutment sufficiently to break several heavy waling timbers. These were promptly replaced and reinforced and no further damage resulted.

The masonry of both abutments was completed early in October, and all structural steel for the arch ribs erected during that month. Arch ribs were concreted in November and the whole of the floor slab concreted in one continuous operation on 6th, 7th and 8th December. The end of the year found the structure all but complete.

Engineering Notes

Japanese Capital in China.—According to the "Manchuria Daily News" the total Japanese capital invested in China amounts to Y.1,857,000,000. Of this amount, Y.626,000,000 represent bank advances.

Hydraulic Control Gear for Japan.—The water supply to four turbines, with an aggregate horse power of 126,000, at Komaki, on the Sho river, Japan, will be controlled by valves manufactured by Messrs. J. Blakeborough & Sons, Brighouse.

Japanese Agency for Electric Furnaces.—Messrs. Automatic and Electric Furnaces, Limited, 173-175, Farringdon Road, London, E.C.1, announce that they have entered into an arrangement with Messrs. G. Blundell and Company, Ltd., 7, Yamashita-Cho, Yokohama, for the sale of Wild-Barfield electric furnaces in Japan.

Switchgear for Perak River Hydro-electric Co.—Over 100 circuit breakers, weighing up to 10 tons each, and 700 high-voltage insulating switches, are being built by the Metropolitan-Vickers Electrical Co., Limited, Trafford Park, Manchester, for use in the Kinta Valley tin mining district which derives its supply of electricity from a hydro-electric station at Chendoroh, near Penang, owned by the Perak River Hydro-electric Co.

Air Services in The Far East.—It is proposed to establish an air service for passengers and mails between Osaka, in Japan, and Shanghai, in China. A company has been floated in Japan for the purpose, with a capital of 2,000,000 yen. Japanese aeroplanes are to be used for the start, but orders may possibly be placed in other countries when the full complement of machines is needed. The journey is to be made in three stages and will, it is estimated, occupy a total time of $11\frac{1}{2}$ hours.

Industrial Works in Tsingtao.—Most of the industrial works in the former Kiaochow Leased Territory are at Szefang and Tsang-kow, two outlying towns in Tsingtao suburbs, both being on the Kiaochow-Tsinan Railway. They were developed as industrial centres by the Japanese during their occupation of Tsingtao. There are seven cotton mills, one chemical dye-stuff manufacturing plant and a number of modern brick manufactories operating at these two towns. Of the brick manufactories only a few are in operation, the rest, mostly Japanese owned, having been suspended owing to the slackening demand for building materials in Tsingtao. Of the seven cotton mills the majority, including the Naigai Water Kaisha, the Kanafugchi Cotton Spinning Co., the Nakasaki Cotton Spinning Co. and the Dah Kong Cotton Spinning Co, are Japanese owned. The dye-stuff manufacturing plant is owned by Chinese capitalists. Although most of the brick and tile manufactories are financed by Chinese capital, the Shantung Pottery Works is a Japanese concern. It is operated on a large scale.

Motorship Statistics.—The following figures are taken from Lloyd's Register Shipbuilding Returns for the Quarter ended 30th June, 1927 :

1. Among the Merchant Vessels under Construction in the World, motorships take the first place with a total Gross Tonnage of 1,459,595 tons. This is the first time that this figure has exceeded the gross tonnage of steamers under construction.

2. From table 3, entitled "Marine Engines under Construction in the World," it is seen that Switzerland takes the fourth place in "Countries of Build," coming after Great Britain, Italy and Germany, with a total of 93,850 I.H.P. In Switzerland, Sulzer Bros. is the only firm building Diesel Marine Engines for merchant vessels, so that the above statement means that :

The total horsepower of Diesel marine engines under construction in our Works at Winterthur at the end of June, 1927, exceeds that of the Diesel marine engines under construction in the whole of Denmark, or of Holland, Sweden, France, etc.,

Manchurian Gold Fields Co., Ltd.—During the year a British syndicate, backed by large capital in London, known as the Manchurian Gold Fields Company, Limited, has been negotiating with the Chinese authorities and local mine-owners with a view to exploiting the possibilities of gold in northern Heilungkiang. If the negotiations are successful, it will result in the employment of foreign capital in gold-mining in this region for the first time.

New Docking Facilities on the Yangtze River.—The Kailan Sales Agency is constructing a hulk at Kiangyin, on the south bank of the Yangtze in the Province of Kiangsu, in order to facilitate the discharge of coal from ships for transhipment by barges to the factories in Wusih and Changchow. This will eliminate the rail journey at present necessitated over the Shanghai-Nanking Railway from its wharf at Woosung, which is situated at the mouth of the Yangtze river. The construction of a branch line to connect Kiangyin with the main line at Wusih, the most progressive industrial city in China, has already been mooted, but lack of funds have prevented the carrying out of the project.

Motor Cycles in Japan.—The motor cycles, says a recent report from Tokyo, is making a great advance in popularity among the Japanese. It fills a real want in Japan, since it affords a rapid means of travel on the narrower roads which are inaccessible for cars. There have been pleasing indications, particularly during the past year, of the increased use of British machines. It is being realised that, while handier to ride than the more powerful American machines, which are their principal competitors, and are largely used with side-cars or parcel van attachments, the British machines are thoroughly reliable and capable of all the speed required. In the provinces they have the advantage that they can be pushed or lifted more easily over bad places. A considerable variety of makes are now represented in Japan, and are reported to be giving satisfaction. Manufacturers of motor cycles would be well advised to pay especial attention to the registration of their trade marks and trade names. Though the latter are protected by international convention without the necessity of registration, the number and variety of such names is so great that unscrupulous applications to register them as trade marks are extremely difficult to detect, and when registration has once been effected the legal procedure for cancellation must entail expense.

Mining in Anhwei.—In 1926 the Government Mining Administration of Anhwei had three mines in operation each equipped with boilers, pumps, telephones, hospital, lighting plant, fans, and various other mining machinery. These mines are : 1. Shuitung mine a bituminous coal mine, situated in the Suanchen district about 70 li from the city. It has a producing capacity of 120 tons a day. The output for 1926 amounted to 28,408 tons. A light railway connects the mine and Shwangkiao, on the Neiho. It has two light locomotives, 20 5-ton coal-cars, and six third class passenger-cars. The traffic along this line is very great. Shwangkiao coal is afterwards transported to Wuhu by native junks towed by steam-launches, when the condition of the river makes it possible. 2. Mantoushan mine a soft anthracite coal mine, situated in the Kweichin district about 15 li from the city. Its production is about 100 tons a day. The total output for the year was 15,362 tons. This mine is connected to Siakiangkow on the Yangtze, by a 2-foot gauge track of 9 li distance, run by push-cars of $1\frac{1}{2}$ tons capacity. 3. Yinchiahui mine which also produces soft anthracite coal, is situated in the Kweichih district about 50 li from the city. It produces about 50 tons daily, and the total output for the year was 6,000 tons. A 2-foot gauge track carries the coal from the mine to Penghwangtsui a distance of 5 li. Thence the coal is transported by the river. Besides, a coal briquetting plant has been established at Wuhu, compressing the dust anthracite coal into egg-shape briquettes. Its production is 20 tons a day. These briquettes are very much in demand and find a ready market.

Mitsui Bank Takes Osaka Electric Bonds.—The Mitsui Bank has signed a tentative contract to underwrite the Osaka Municipal Loan to the amount of Y.73,816,800 according to an announcement made to The Trans-Pacific Wednesday by Officials of the institution. This decision follows repeated failures to effect an agreement between the Osaka authorities and the representatives of foreign banking houses.

According to the announcement, the bonds, which will be callable by drawings, will bear a coupon of 6 per cent. They will mature in 1945, running 18½ years. Redemptions are to begin in 1929, two years hence. While details regarding issue price and exact date of issue have not been decided, the Mitsui Bank officials declared that the yield to the investor is expected to be about 6.8 per cent. Under these circumstances, the issue price will be about Y.95.

The contract is subject to the approval of the Finance Minister. The bonds will not be guaranteed by the Government. They are in two series and have as their purpose the redemption of outstanding bonds issued for electric power purposes. The first series is the larger, involving Y.70,120,800. The second is for Y.3,696,000. According to the provisional agreement, Osaka will begin redeeming the bonds in the fall of 1929, when first series bonds totaling Y.900,000 and second series bonds totaling Y.114,000 will be drawn. Drawings for later years will be based on a certain fixed percentage of the bonds remaining outstanding.

Japanese financial circles are greatly interested in the proposition that the Mitsui Bank has advanced, as it will mark a new departure in the banking business of this country. The issue, if floated successfully, will be the largest ever to have been underwritten by a single Japanese bank and one of the largest ever attempted by a single financial house anywhere in the world. Whether other houses will be invited to participate has not been indicated.

The Osaka loan has been in the financial public's eye for some months, first coming to general attention shortly after the successful Tokyo and Yokohama financing in New York City. Representatives of American bond houses who were in the country expressed a deep interest in the proposition and immediately commenced negotiations with the Osaka chiefs. The Japanese officials soon

found that their ideas regarding Japanese credit were not those of the foreign bankers, especially in view of the fact that the summer months are notoriously poor for the flotation of new issues in New York. For some time it had seemed that the entire matter would be allowed to rest for a more propitious time when the Mitsui announcement was made Wednesday.

Road-Building in Foochow.—Foochow authorities have recently organized a Highway Commission with Hwang Ping-wu as Chairman. Six engineering corps of 500 men each, composed chiefly of prisoners of war taken from the northern troops, have been organized to build a highway between Foochow and Mamoi about 50 li apart.

Tientsin Electric Company.—The report of the *Compagnie de Tramways et Eclairage de Tientsin* for last year shows that there was an increase of 28 per cent. in the electric tramway receipts and of 3.4 per cent. in those from electricity supply for lighting and power purposes. In order to meet the increasing demand a new steam turbine and generator of 6,800 kw. capacity is being installed at the power station.

Toa Kogyo Reorganized.—The Toa Kogyo Kaisha (East Asia Industrial Development Company, Ltd.) which was established in 1918 with the object of investing in China, has been reorganized. Mr. Ryohei Shiraiwa, managing-director, has resigned. Mr. Chokiuro Kadono, vice-president of Okura & Company, has been recommended as chairman of the board Mr. K. Onuki, manager of the Okura company, is now managing-director. This company so far has invested about Y.50,000,000 in various industrial enterprises of China but, due to the continued war disturbances, collections have become almost impossible. The company borrowed most of this money from the Deposits bureau in the Finance Ministry and syndicate banks but the payment of the principal and interest is being suspended under the circumstances. The company was established at a capitalization of Y.1,000,000 which was later increased to Y.3,000,000 and then to Y.20,000,000.



THE NEW FAIRBANKS-MORSE Electric Light and Power Plant

Years ahead in Design and Construction.

THE plant you have been waiting for—simple, smooth running, quiet, dependable, easy to understand and economical to operate. Designed so there is a steady flow of electricity at all times. Lights will not flicker, whether it is

USED WITH OR WITHOUT ACCUMULATORS

This new plant has a large number of excellent features—many of them exclusive. It will operate with or without accumulators—it will use either petrol or paraffin—it is automatically lubricated under pressure—the "Ricardo" cylinder head is used—all working parts are completely enclosed—it is equipped with a patented enclosed cooling system—it is simple and safe. No other electric light plant is more advanced in design—none is better built. Complete descriptive catalogue will be gladly sent on request.

FAIRBANKS, MORSE & COMPANY

Export Department, 900 S. Wabash Ave., Chicago, Ill., U.S.A.
122 Greenwich Street, New York, N.Y., U.S.A. Cable Address: "Eclipse" for both cities.
London Buenos Aires Rio de Janeiro Sydney

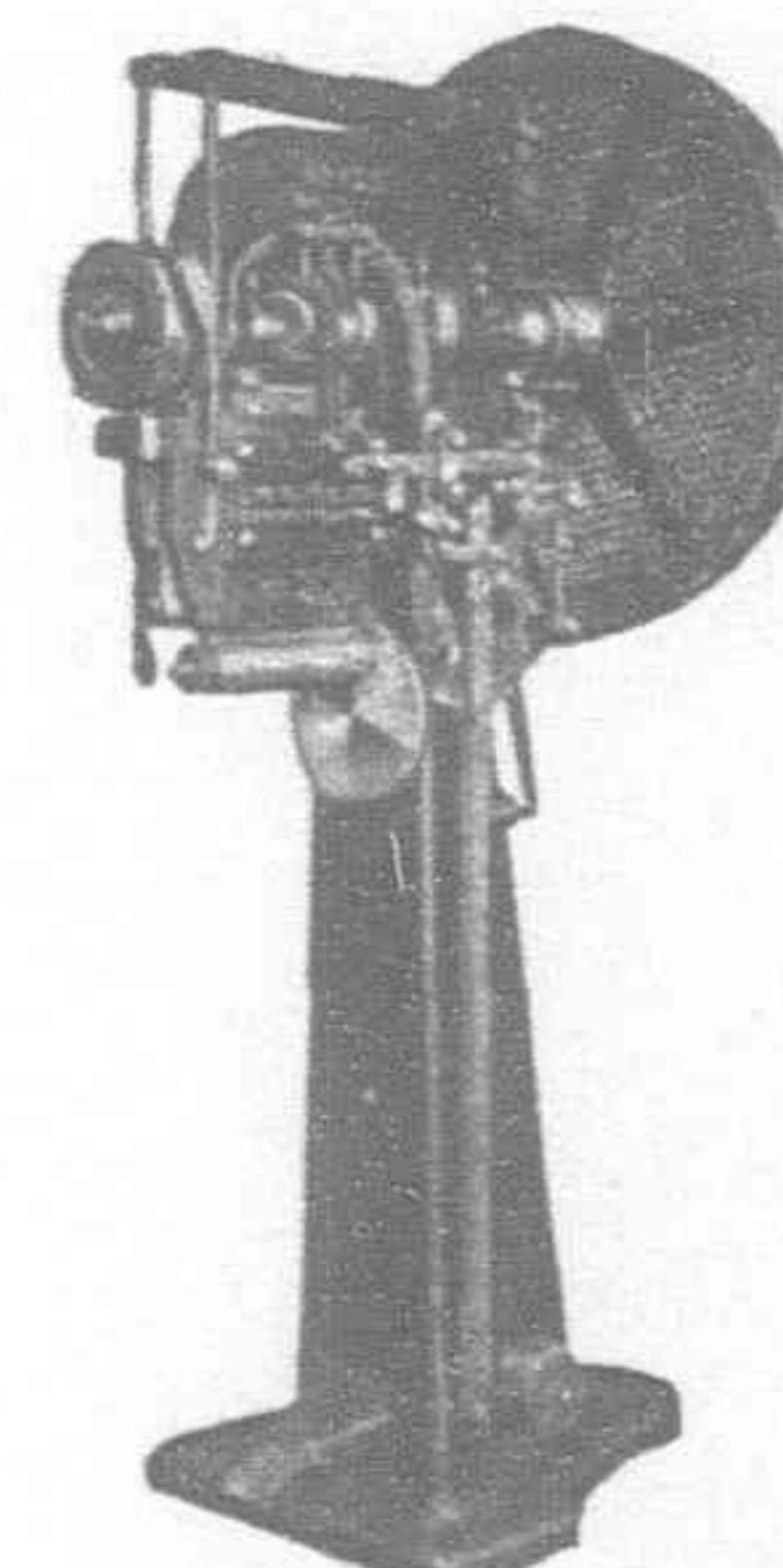
Far Eastern Agents:

Sale & Company, Ltd., Tokyo
Borneo Co., Ltd., Singapore & Ipoh
Pacific Commercial Co., Manila
International Engineering Co., Bangkok
M. S. Vernal & Co., Calcutta
McKinneys, Ltd., Bombay

The complete Fairbanks-Morse line comprises stationary and marine Diesel engines, the famous Type "Z" gasoline kerosene engine, electric water plants, electric lighting plants, electric motors and generators, windmills, pumps, railway equipment.

BLISS

SHEET METAL WORKING MACHINERY



BLISS for MACHINERY

Bliss machinery successfully meets every requirement in the sheet metal field. There is a Bliss Press just the right type and size to meet your needs most efficiently.

Over 70 years of specialized effort in the sheet metal working machinery field has given us the ability to understand and successfully meet the problems of the manufacturer from the practical operating point of view.

Write us in full detail your particular problem. We will tell you the Bliss equipment that economically meets it.

E. W. BLISS CO., BROOKLYN, N. Y., U. S. A.

Factories: Brooklyn, N. Y. Hastings, Mich. Salem, O. Cleveland, O.
Foreign Factories & Offices: London, Eng. Turin, Italy. Paris, France

Electric Railways in Japan.—In its last Budget, the Japanese Government set aside 100 million yen to be made use of over a period of three years in the electrification and extension of railways. The lines between Tokyo and Yokohama and between Tokyo and Koku bunji are amongst those to be electrified.

Rubber Manufacturing Companies in Foochow.—Two rubber manufacturing companies, the Foochow Rubber Mfg. Co. and the Yung Kwang Rubber Mfg. Co. are operating in Foochow. Their operations were suspended for sometime last year owing to the high cost of the raw material, which at one time jumped to over \$300 a picul. The output of these companies consists chiefly of rubber soles, which, however, are no longer in much demand in Foochow owing to high prices and the deterioration of quality caused by too much adulterant in the manufactured article. As a result, each of the companies has reduced its daily output from 1,000 pairs of soles to about half that number. The present market price for a pair of rubber soles for Chinese shoes ranges from 45 to 55 cents. Rubber soles for foreign style shoes are quoted at \$1.

Sulzer Brothers.—Kobe Office transmits an order for 12 pumps for the Aratama Municipal Waterworks, Japan. Of these 12 pumps, which represent a total of 2,400 H.P., six are LZP No. 40e 30, delivering raw water to the filters and working under the following conditions:—

Quantity ...	... abt. 3,830 gals. per min.
Delivery head ...	... „ 2,905 ft.
Power absorbed	... „ 44 H.P.
Speed ...	... „ 720 R.P.M.

The other six pumps are 2-stage HCP of a special type, delivering the filtered water to the town mains. They work under the following conditions:—

Quantity ...	... abt. 3,830 gals. per min.
Delivery head ...	... „ 240 ft. total
Power absorbed	... „ 355 H.P.
Speed ...	... „ 960 R.P.M.

Chefoo-Weihsien Motor Road.—The business of the Chefoo-Weihsien Motor Road Company improved considerably during 1926, the balance of income over expenditure being about \$150,000, thus placing the company in a position to declare a dividend in the neighborhood of 30 per cent. There have been no extensions to the road, which has been kept generally in good repair, and the cars now total 64. The road was thrown open to private cars in June on payment of certain fees and observation of certain rules.

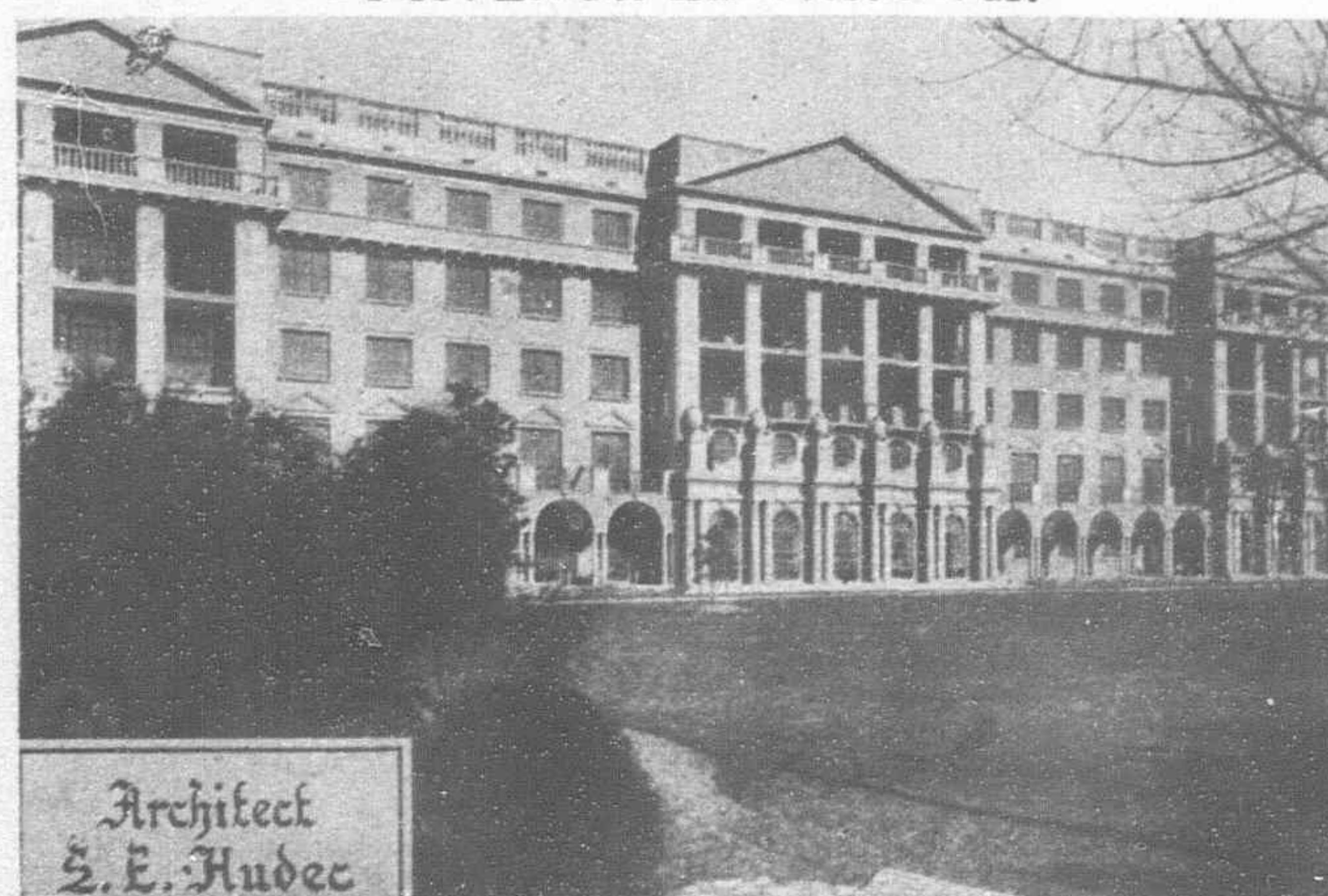
Manufacture of Bone Dust.—The Central Agricultural Experiment Station Peking, has discovered a simple and inexpensive method of manufacturing bone dust. The method consists in piling bones, straw ash and unslackened lime in successive layers in a pit and covering them with earth for three or four months. Meantime, water is sprinkled over the heap so as to enable the live lime to absorb the fats from the bones. The bones are then dug out, dried in the sun and reduced into dust in a mortar. From every six catties of fresh bone, about three catties of dust can be produced. The cost of making one catty of bone dust amounts to hardly four coppers. The straw ashes can be gathered and used also as fertiliser. This is the slow method. For immediate use, bone dust can be prepared from fresh ones by burning the bones with straw or firewood for about 10 minutes, when the bones lose all the fats and become highly fragile. The bones are then reduced to dust. The second method is more wasteful because the action of the fire expels all the nitrogen from the bones and as fertiliser the bone dust so prepared is less effective.

For the first method, the pit may be dug to a depth of two or three feet, while the circumference may vary according to the quantity of its contents. The bottom of the pit must be made compact by pounding and its surroundings must be banked with wooden planks to prevent inundation by rain water. The proportion of bone and straw ash is equal, while the quantity of live lime need form only one-sixth by weight of either the two. The pit should in no way be allowed to be flooded, lest it should lose a part of the valuable fertilising materials. The bone dust is usually used by the farmers in making a compost heap with such admixtures as decayed clover and other kinds of grass.

SULZER BROTHERS

SHANGHAI ENGINEERING OFFICE

4 AVENUE EDWARD VII.



Architect
S. E. Hudec

Uniflow Steam Engines, Air and Gas Compressors, Upright Watertube Boilers, Cornish and Lancashire Boilers, High and Low Lift Centrifugal Pumps, Fans and Ventilators for all purposes, Fire Engines, Stationary and Marine Diesel Engines, Airless Injection Diesel Engines, ICE-MAKING AND REFRIGERATING PLANTS, Maag Gears and Maag Planing Machines.

Country Hospital
Shanghai

fitted with
Sulzer Refrigerating
and
Ice-making plant

水壽院
機器
上
造冷及
內設蘇
上海宏恩醫

本公司常備目錄供給各界
垂詢工程事務亦局誠酬答
蘇爾壽工程事務所
上海愛多亞路四號

WINTERTHUR. SWITZERLAND.